

 **Johns-Manville**

**Industrial
Hygiene
Engineering
Services**

ENVIRONMENTAL CONTROL SYSTEMS DIVISION



**Johns-Manville
Sales Corporation**

Greenwood Plaza
Denver, Colorado 80217
(303) 770-1000

September 20, 1973

Mr. D. E. Frazier
Vice President, Mfg.
Roofing and Plastics Division
Bird & Son, Incorporated
East Walpole, Mass. 02032

Dear Mr. Frazier:

I apologize for the delay in responding to your recent letter of August 24, 1973. Mr. Russ Fortin, our engineer in charge of the project, has been on a lengthy business trip, and we awaited his return before answering your questions.

I would at this time like to answer the questions you had pertaining to our Shreveport engineering report.

1. Pertaining to our vacuum system suggestions, we do not recommend using a low-pressure dust system for vacuuming, as it will not clean sufficiently. It has also been suggested by OSHA that the cleaning of fiber be done with a vacuum system.
2. As the report mentions, incineration can be used. This was discussed between the Plant Manager and Mr. Fortin. However, based on the incineration equipment existing at the time of our study, it is our opinion that the cost of duct work, supports and fan would exceed the cost of the HEAF proposed.
3. As far as the noise requirements are concerned, you are correct. An obsolete paragraph regarding the "C" scale was inadvertently included. The second paragraph applies. This will give you sufficient sound power data (on the fan data sheet) to evaluate the affect on nearby working areas in sound pressure level terms.
4. Regarding the assurance or certification that our recommendations will meet OSHA or EPA requirements, I should like to say that the system that has been designed will be adequate to handle the conditions that were evaluated during the study and detailing work. Johns-Manville has always stood behind its merchandise and in most cases has given the benefit of doubt to its

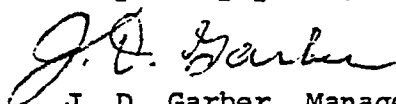
Mr. D. E. Frazier
September 20, 1973
Page 2

customers. In the event we are retained as field supervisors to insure correct installation per our detailing, we will at the start-up or shortly thereafter make provisions to conduct an Industrial Hygiene Survey to insure the system's capability. If for any reason other than process changes or changes in operation our system is not proven to be within regulatory requirements, we assure you that Johns-Manville will work with you to correct the situation at no additional engineering consultation charges.

5. Your assumption regarding bag disposal is correct. We have detailed the spout and clamp to be used for this purpose.

It is our hope that these answers satisfy your questions. If you should need further clarification, please do not hesitate to let us know. Again, I apologize for this late response.

Very truly yours,



J. D. Garber, Manager
Industrial Environmental Engineering Services

BGR/lh

August 24, 1973

Mr. J. D. Garber
Manager-Industrial Environmental Engineering
Johns-Manville
Greenwood Plaza
Denver, Colorado 80217

Dear Mr. Garber:

I have reviewed your report with engineering plan for emission control at our Shreveport Plant Asphalt Cement Operation.

There are several questions which we have and hope you will be able to provide us with assistance.

1. Under paragraph 2.2.2 - Vacuum System. We feel the need for a Vacuum System for cleanup of area or clothing would be generated at the termination of batch production. Wouldn't it be possible with proper location of blast gates in the dust collector piping to provide separate air intake for Vacuum System purposes?
2. Under paragraph 2.3 - Mixer Fume Control. Since we incinerate fumes close by, is there any reason we could not substitute this for the proposed HEAF unit?
3. Under bid specification, Noise Level requirement of 90 decibels on the "C" Scale, why do we use the "C" Scale? It is our understanding that the applicable codes use the "A" Scale. Please advise. Also, why not 85 decibels to take care of cumulative effect possible with other equipment?
4. In your letter of April 19, 1973 you state "We feel that, with the experience we have had with the design of such systems, we can offer you the most economical system that will meet the stringent requirements being imposed on the various materials you are handling". Will Johns-Manville certify to this for system proposed with regard to OSHA or EPA?
5. Drawing 35759-2 does not appear to indicate any detail of removal of accumulated material in collection hopper. From the description under paragraph 2.2.5 -

Mr. J. D. Garber

2.

August 24, 1973

Bag Disposal, I am assuming a plastic bag has to be clamped to bottom opening and disposal will be by local custom.

May I hear from you soon on these matters?

Very truly yours,

D. E. Frazier
Vice President, Manufacturing
Roofing and Plastics Divisions

DEF:R
cc: A.G. Marsh
G.L. Dusty



Johns-Manville

Greenwood Plaza
Denver, Colorado 80217
(303) 770-1000

August 16, 1973

Mr. D. E. Frazier
Manufacturing Manager
Bird & Son, Inc.
East Walpole, Mass. 02032

Dear Mr. Frazier:

Attached please find three copies of our report on the dust control recommendations of your cement plant at Shreveport, Louisiana.

In addition to the reports, we have also included a quote and sketch of our "mini-HEAF", a pollution control device which we feel would be suitable for your purposes.

Referencing our report, please note that there are a few blanks in the report that should be filled in by your staff. These blanks are located in the following areas:

1. Dust Collector Specification. Item 10.4
- Name of manufacturer for electrical starters.
2. Dust Control System, General Conditions. Top of Page 2
- Date of completion desired.
3. All Specifications.
- Project number assigned by Bird & Son.

If you have any further questions concerning this report or desire additional copies, please do not hesitate to contact us.

It has been a pleasure doing business with your firm, and we look forward to further exchanges with you.

Very truly yours,

J. D. Garber, Manager
Industrial Environmental Engineering Services

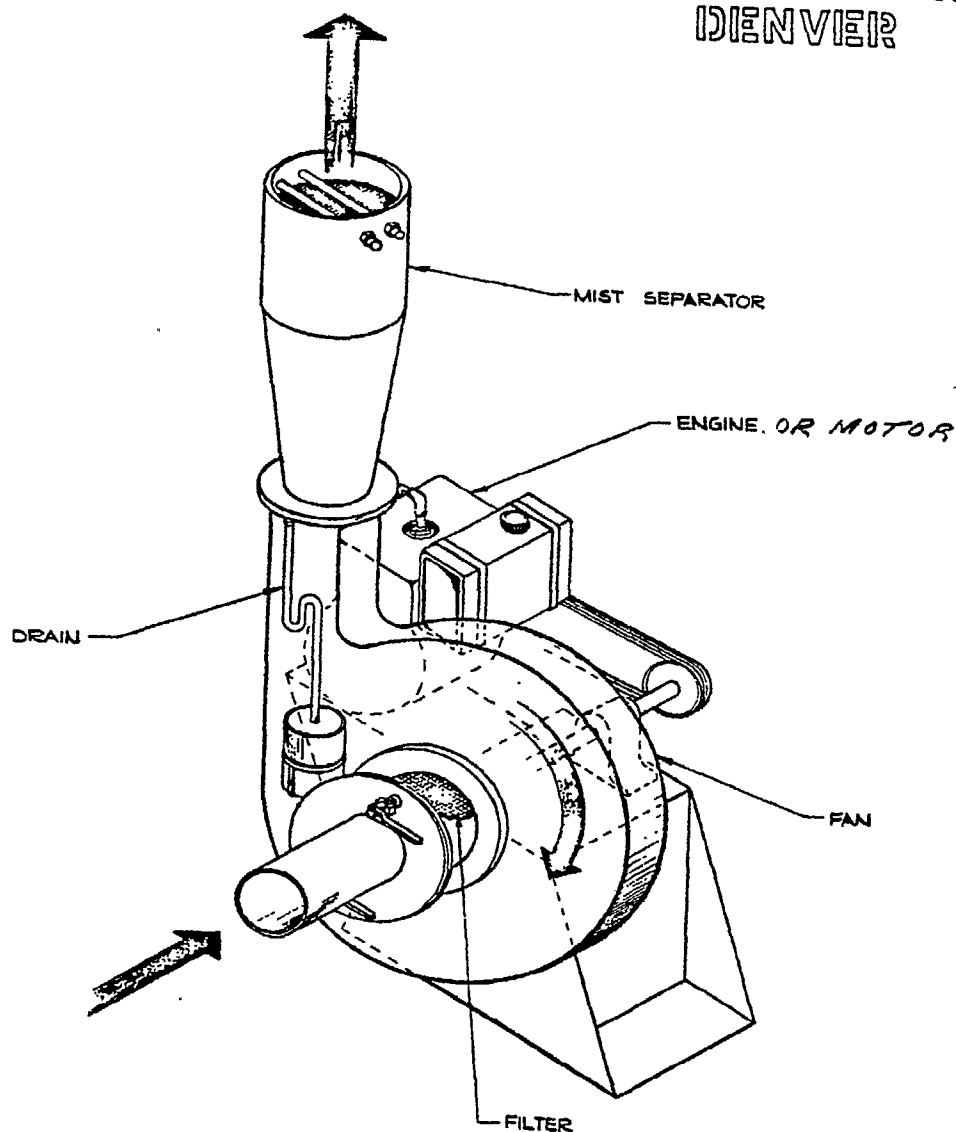
BGR/lh

Enclosures

P.S. We are forwarding under separate cover reproducible drawings.

**MINI
HEAF**

JOHNS-MANVILLE
CORPORATION
DENVER



ENGINEERING REPORT

DUST CONTROL SYSTEM

RECOMMENDATIONS

FOR

CEMENT PLANT

AT

BIRD AND SON, INC.
SHREVEPORT, LOUISIANA

BIRD AND SON, INC. P. O. #13-2695, DATED MAY 4, 1973

JOHNS-MANVILLE PROJECT NO. W63-7706

Prepared By: Johns-Manville Sales Corporation
Industrial Environmental Engineering
P. O. Box 5108, Greenwood Plaza
Denver, Colorado 80217
(303) 770-1000

August 10, 1973

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 - 5.1 No. 35759-2 - Dust Control System
 - 5.2 No. 35760-2 - Hood Details

1. Summary

1. Summary

The Bird and Son, Inc. plant in Shreveport, Louisiana was visited on June 20, 1973 for the purpose of recommending dust control on handling of asbestos and talc in the cement plant.

The cost of a complete dust control system is estimated at \$24,200 (see Section 3.1). The system will include sheet metal hoods, ductwork, cloth tube dust collector and exhaust fan, complete with motor and drive.

The estimate is based on contract labor at straight time rates.

Although not part of this contract, we wish to point out that it is necessary to control the fume generated while filling the mixer with hot asphalt. A recommendation is included for a Johns-Manville "Mini-HEAF" unit, at an estimated cost of \$7,800, installed. (See Sections 2.3 and 3.2.)

2. Discussion

2. Discussion

Following are some notes on dust control recommendations in the cement plant where asbestos fiber and talc are fed into a mixer. Details of hoods and the dust system are shown on the drawings. Bid details for equipment and installation are covered in the specifications in Section 4 of this report.

The design and equipment locations were reviewed during the field visit. However, some modification of locations and design can be made to suit field conditions without detriment to the basic design.

The hood design is a combination of two hoods and empty bag disposal. Because of its complexity and the necessity of fitting different contours of the equipment, the details and dimensions should be carefully field checked by the successful bidder before fabrication.

Fume control is required also on the mixer (see Section 2.3).

Estimated power requirements are 10 HP for the fan and 3/4 HP for the shaker motor.

The estimated cost of dust control is \$24,200 (See Section 3.1).

2.1 Equipment Manufacturers

Following is a list of suggested manufacturers of equipment. It is not meant to be complete as there are many other national manufacturers of reliable equipment, as well as local manufacturers.

Dust Collector

- Wheelabrator-Frye (Pittsburgh, Pa.)
- Industrial Clean Air (Berkeley, Calif.)
- Fuller-Dracco (Cleveland, Ohio)
- Johnson-March (Philadelphia, Pa.)
- Pangborn (Carborundum Corp. - Knoxville, Tenn.)
- R. F. Cox Associates, Inc. (Essex, Mass.)
- Flex-Kleen Corp. (Chicago, Ill.)

Fan

- Buffalo Forge (Buffalo, N.Y.)
- Bayley (Milwaukee, Wisc.)
- Sheldons (Bensonville, Ill.)
- American Standard (Detroit, Mich.)
- Westinghouse (Boston, Mass.)
- Clarage (Kalamazoo, Mich.)

Most such companies have regional offices in large cities.

2.2 Dust Control Notes

Following are some items that bear repetition or discussion:

2.2.1 Hood Design

The basic premise here is to keep the air flow interface between the man and the dust source, plus supply sufficient indraft velocity to overcome any energy imparted to the dust that is trying to force it towards the operator. The air volumes and sizes of the working openings are based on our experience. However, it is recognized that this is not an exact science, so there is some leeway should you feel that the working opening needs slight enlarging. But just as important is the need to train the operators to work carefully and not handle dusty material outside of the ventilation hoods.

2.2.2 Vacuum System

This is almost imperative (and is becoming so in codes governing handling of fiber) so that no manual cleaning is required. Not only the bags should be vacuumed but the slightest spill should be immediately cleaned up. This will only happen if the vacuum system is area-wide and convenient. We strongly recommend a central vacuum system. A dust control system cannot keep your atmosphere clean if spills are allowed to accumulate. The entire area must be cleaned thoroughly, top to bottom, after installation of the dust control.

2.2.3 Clothes Clean-up

The vacuum system may also be used for cleaning men's clothes, rather than blowing the dust off, which can contaminate the atmosphere for many hours. Johns-Manville has designed and used blow-off booths, with special low pressure nozzles, that exhaust into existing dust collection systems as alternate exhaust volumes when the production systems are not in operation. Acceptability of cleaning method must be checked with local authorities also.

2.2.4 Utilization of U-Gauge on Dust Collector

This is a useful, but often misused, tool for keeping tabs on operation at the dust collector.

On initial start-up it will be noticed that the differential pressure will be quite low (-0.5" to 1.0" w.g. /water gauge/). After operating a few days it should build up to approximately 2.0" to 3.0" w.g. Upon shaking the bags it should drop to approximately 1.5" to 2.5" w.g., but not all the way back to the clean pressure at start-up. If it does, the bags are being shaken too severely, and shake time should be reduced. Normal shake time is about 1½ minutes, but experience may reduce this to as little as 30 seconds. The less shaking done, the less wear on the bags and the shaker mechanisms.

Experience will show how high you can let the pressure climb before a reduction in air volume is experienced, reducing effectiveness of the dust control. For maximum duration and minimum shaking, this cycle should be timed initially and a shake schedule set up at some time less than this to prevent reduction in dust control. Then the bags can be shaken for a variety of lengths of time and note the minimum time which gives a reasonable reduction in differential pressure. By this method, maximum filtration and minimum wear will be experienced.

The bags must never be shaken while the fan is in operation, or even coasting to a stop. Blinding of the cloth, and excessive wear and pressure drop will result. It is important to check the operation of the timer to be sure it is properly adjusted to allow the fan to come to a complete stop before the shaker motor starts. Differential pressure should be at 0" at this time. Maximum permissible differential pressure is 4.0" water gauge, by code.

2.2.5 Bag Disposal

The method as shown has two distinct advantages - it obviates removing the bag from the ventilated area to another ventilated area and it eliminates the need for additional ventilation at the disposal point. Handling an empty, dusty bag in the open is as severe (and sometimes more so) as the dust producing equipment itself.

Empty, dirty bags (especially asbestos bags) and dust from any dust collector or vacuum cleaning system should be placed in a clean plastic bag and tied off tightly for delivery to a dump site. EPA requirements in some states require covering the dumped bags with earth or some means to prevent wind dispersal of dust after dumping.

2.3 Mixer Fume Control

Hot asphalt is pumped into the mixer at about 450°F. The large amount of fume generated by this operation must be controlled to meet EPA standards and it must be kept out of the dust control system.

The mixer should be kept under negative pressure and the fume laden air exhausted to some form of air cleaning equipment, such as a "HEAF" system, electrostatic precipitator or incinerator.

We recommend a Johns-Manville "Mini-HEAF" unit, 500 cfm, 7½ HP, to keep the mixer under negative pressure to control the fume. It could be lagged to the floor near the mixer. Due to the possibility of some solids being exhausted as well as the fume, it is anticipated that the filter element (worth about 70¢ and easily replaced) will require replacement with each batch.

The installation would simply consist of the following:

1. Mount unit on floor near the mixer.
2. Install a 6" dia. duct connection between the mixer and HEAF.
3. Install an adjustable backdraft damper in the 6" duct to control the negative pressure on the mixer and to bleed in room air to control the inlet air temperature to the HEAF to about 180°F.
4. Install a discharge duct to the outside.
5. Connect the 7½ HP, 460V motor to a power supply.

The estimated cost of installing such a system is \$7,800. (See Section 3.2)

The installation is shown schematically on the "Dust Control System" drawing. Detail design is not a part of this contract.

3. Estimates

3. Estimates

The estimates are budget type based on experience with many similar projects plus recent equipment prices. They reflect a general financial exposure to be expected and attempt to take into account short-term escalation.

3.1 Dust Control System	\$24,200
3.2 Mixer Fume Control - HEAF	\$ 7,800

Bird & Son, Inc.
(Client)

Est. No: 3.1

Dust Control - Cement Plant
(Project Title)

Est. By: REF

Shreveport, La.
(Location)

W63-7706
(Job No.)

Date: 7/26/73

Dust Control
(System)

Description	Material	Installation	Total
1. Cloth Tube Dust Collector, Intermittent type, with pre-wired control panel. Factory assembled foundation.	6,500	3,500	10,000
2. Centrifugal Fan, motor, & V-belt drive, OSHA guard assembled (Arrangement #9). Foundation	1,000	1,200	2,200
3. Ductwork, Hoods, Supports	1,000	6,000	7,000
4. Electrical	500	1,500	2,000
Taxes	500		500
Engineering (Design Completed)	-	-	-
Contingency	1,000	1,500	2,500
Total	10,500	13,700	24,200
1. Costs based on contract labor at straight-time rates.			
2. Does not include normal overhead costs which depend on client's method of accounting.			

ESTIMATE

Johns-Manville Sales Corp.

Bird & Son, Inc.
(Client)Est. No: 3.2Dust Control - Cement Plant
(Project Title)Est. By: REFShreveport, La.
(Location)W63-7706
(Job No.)Date: 7/26/73Fume Control
(System)

Description	Material	Installation	Total
1. Johns-Manville Mini-HEAF 500 cfm, with 460V, 7½ HP motor, assembled on base	2,600	500	3,100
2. Ductwork	300	1,000	1,300
3. Electrical starter, P/B, wiring, conduit	400	700	1,100
4. Freight	100		100
Taxes	200		200
Engineering	1,000		1,000
Contingency	500	500	1,000
Total	5,100	2,700	7,800
1. Costs based on contract labor at straight-time rates.			
2. Does not include normal overhead costs which depend on client's method of accounting.			

4. Specifications

Environmental Engineering Dept.

15 Aug., 1973

BID
SPECIFICATIONS
FOR
CENTRIFUGAL FAN
PROJECT:

Application

One (1) industrial exhauster, air wheel, centrifugal fan is required to draw air from the clean air side of a cloth dust collector. The fan will be located outdoors. The air handled will be at 70°F and 29.92" Hg. barometric pressure. The plant location is Shreveport, Louisiana.

Performance

1. The fan shall be capable of exhausting 3300 CFM of standard air against a total pressure of 10.0" w.g.
2. The fan shall conform to the standards established by NAFM and adopted by AMCA. All data on fan performance shall be certified ratings authorized by AMCA. The fan manufacturer shall be authorized to display "Certified by AMCA" seal on his equipment.
3. The fan shall be selected to operate at or near the peak efficiency point. No maximum outlet velocity is being specified. However, the fan will be evaluated from a power consumption standpoint. Fan speed shall not exceed 80% of maximum allowable for the supplied bearings and shaft.

Description

1. The fan shall be clockwise rotation, vertical upblast discharge, single inlet, single width, Arrangement 9.

2. The fan casing shall be fabricated of steel plate. The fan wheel shall be steel. The fan bearings shall be anti-friction type, self-aligning for grease lubrication. Fan bearings, shaft end and the inlet and outlet shall be protected so that corrosion or other damage resulting from shipment or from storage outdoors shall be minimized. Fan inlet and outlet shall be flanged.
3. The fan shall be finish painted to the manufacturer's standard.
4. The motor and drive shall be included, plus OSHA approved belt guard.
5. The fan shall be equipped with one fixed and one free bearing. The fixed bearing shall be located at the drive pulley end.
6. The fan bearings are to be designed to take the belt pull of a 15 HP V-belt drive.
7. The fan wheel and shaft shall be statically and dynamically balanced at the factory. The displacement, measured in mils at the bearing, shall not be more than shown in the following table when the fan is running at rated speed.

<u>RPM</u>	<u>DISPLACEMENT (MILS)</u>
600	2.0
900	1.5
1200	1.0
1800	0.75

Noise Level

It is the intent of the purchaser that no piece of equipment is to be installed in his plant that develops a sound pressure level of over 90 decibels as read on the "C" scale of a General Radio Sound Level Meter System #1551-C and Analyzer #1558.

The Vendor must supply (for the fan and drive combination) sound power level rating in accordance with AMCA Bulletin 301 entitled, "Standard Method for Publishing Sound Ratings." The ratings must be the result of tests made in accordance with AMCA Bulletin 300 entitled, "Standard Test Code for Sound Ratings". The readings shall be given in decibels (referred to 10⁻¹² watts) for each of the eight octave bands in the audible spectrum. Bidder shall state test set up (No. 1, 2, 3 or 4).

Vendor Shall Supply:

1. The successful Vendor shall supply to Bird and Son, Inc. six (6) sets of certified prints, applicable parts lists, erection instructions, maintenance and operation manuals.

2. All information called for on attached data sheet.
3. Time of delivery is of prime importance in this order.
4. Price of all equipment, F.O.B. plant at Shreveport, Louisiana.

FAN DATA SHEET

PROJECT: _____

A. Characteristics of the Fan at the Specified Performance:

1. Fan manufacturer and designation _____
2. BHP is _____ at 70°F, _____ at _____ °F.
3. RPM is _____
4. Outlet velocity is _____
5. Fan tip speed is _____
6. Fan wheel diameter and number of blades _____
7. Class of fan is _____
8. WR^2 value (# Ft²) of wheel is _____
9. Maximum Allowable Operating RPM is _____
10. Bearing Description _____
11. Fan Bearings - L10 Min. Life Hours _____
12. Fan Bearing - Radial Load @ the Operating RPM _____
13. In case of axial fan, must Owner supply outlet cone to gain listed performance? Yes _____ No _____

B. Characteristics of the V-Belt Drive: (Fan Arrangement #9 or #10 Only)

1. Manufacturer is _____
2. Belt size and sheave diameters are _____

C. Type of Motor: (Fan Arrangement #9 or #10 Only)

1. Manufacturer is _____
2. HP is _____
3. RPM is _____
4. Type is _____
5. Frame No. is _____
6. Maximum Frame No. that can fit fan is _____

D. Time of Delivery After Receipt of Order is _____

E. Fan Weight Complete with Motor and Drive is _____

F. Price: Fan unit complete as specified including freight to
Shreveport, Louisiana _____

G. Terms of Payment are _____

H. Noise Data - Reported per AMCA Bulletin #300 - Sound Power in
Decibels (Ref. Level 10⁻¹² watts)

AMCA Test Set-Up No. _____

Octave Band No.								
Band Frequency Range	20	75	150	300	600	1200	2400	4800
Cycles per Second	75	150	300	600	1200	2400	4800	9600
Sound Power Rating								

Environmental Engineering Dept.

15 Aug., 1973

BID

SPECIFICATIONS

FOR

CLOTH TUBE DUST COLLECTOR

PROJECT:

Application

An intermittent cloth tube collector is required to collect asbestos dust. Estimated dust loading is $\frac{1}{4}$ grain per cu. ft. The collector will be located outdoors in Shreveport, Louisiana.

Performance

The collector housing and hoppers shall withstand minimum 12" H₂O suction with not more than $\frac{1}{2}$ " deflection in any panel or reinforcing member. A fan, by Others, will exhaust from the clean air side of the collector maintaining a negative pressure in the collector. The air will be 70°F.

Collector Description

1. The intermittent collector shall be factory assembled and finish painted and shall have about 1600 square feet of cloth area. The cloth shall be cotton sateen, silicon treated. Cloth tubes shall be not more than 140" long and not less than 5" diameter. Permeability shall be 15 to 25 CFM at 0.5" w.g. Multi-tube or "pulse-air" types are not allowable.
2. The collector housing shall be weathertight and constructed using a minimum of #14 gauge U.S.S. hot rolled sheets with standing ribs, minimum 2- $\frac{1}{4}$ ", spaced as required by pressure design. All bolted seams shall be sealed with felt and caulking putty. All bolts shall be supplied with lock washers. The necessary felt and putty shall be supplied with collector.

A baffle shall be supplied to shield the inlet into the collector.

The bag collector tube sheet (floor) shall be designed so that it is completely leaktight when assembled and air may only pass through the cloth bags fastened to the floor. Tube collars are required - not punched holes in the tube sheet.

3. The collector hopper shall be pyramidal with inspection door and at least 60° slope and shall be constructed using a minimum of No. 14 gauge. The hopper shall be equipped with a 12" minimum inlet slide gate.
4. The collector shall be supplied with a hinged access door with multiple latches. It shall be designed for quick and easy opening. An access platform and ladder with cage is required to OSHA standards.
5. The collector shall have support legs for about 4'-0" clearance beneath the slide gate.
6. The collector construction shall prevent wear between the cloth and surrounding sheet metal or interior structure. Wall and interior clearance shall be stated in the quotation. Bag relief shall be supplied on one side to allow exhausting of air with no deleterious affect on the adjacent bags. Quoted cloth area shall allow for this reduction in area.
7. The collector cloth shall be shaken by an electric motor operated shaker. The shaking mechanism shall be complete and heavy duty in all respects and shall be designed so that it will shake the accumulated dust off the bags with a minimum of bag wear. The shaker motor and drive shall be fully guarded and mounted outside of the collector housing.
8. The electrical characteristics are 460 volt, 60 Hz, 3 phase. Electrical starters, and timers are a part of this specification.
9. A 14" U-gage shall be supplied with F.W. Dwyer #A310 three-way vent valve, or equal, to allow measurement of the system loads, as well as cloth resistance when the gage is connected to the dirty and clean chambers of the collector. Fittings for 1/4" tubing shall be factory welded to the housing and hopper for ease of installation of the gage.
10. A pre-wired control box shall be supplied by this bidder as follows:
 - 10.1 The Vendor shall supply NEMA 12 enclosed panel containing the following components:
 - 1.1 Solid state timer.
 - 1.2 Fusible starters for the shaker and fan.
 - 1.3 A main disconnect, unfused.

- 1.4 Pushbuttons and pilot lights.
- 1.5 A control transformer, 460/120 volts, 1 side grounded and the other side fused.
- 1.6 Any other auxiliary equipment such as relays, etc., necessary to perform the desired sequence.
- 1.7 This panel shall be completely pre-wired, ready for operation.
- 1.8 The panel shall only require external connections to terminal strips for the motors and the incoming power.

10.2 Desired sequence of operations is as follows:

- 2.1 The fan must be started and stopped manually with pushbuttons. A pilot light should be provided when the fan motor is running.
- 2.2 When the fan is stopped manually, the timer will perform the following sequence:
 - 2.2.1 Two-minute null period.
 - 2.2.2 1½ minute shake, adjustable between 0 and 5 minutes.
 - 2.2.3 Two-minute null period.
 - 2.2.4 The timer then resets so the fan may be manually started.
- 2.3 A manual override to test the shakers shall be provided. This button shall be only operative when the fan is shut down.

10.3 The panel and its components shall be furnished completely wired by the Vendor and shall meet National electrical code and any local state codes such as the California State Code.

10.4 The manufacturer of the equipment for the panel shall be

10.5 The control panel shall have appropriate nameplates, pushbuttons and pilot lights and main disconnect. The nameplates shall be plastic laminated, black with white lettering.

10.6 The main disconnect for the panel shall disconnect all incoming power into the panel. The panel door shall not be able to be opened unless the disconnect is in the "off" position.

10.7 The Vendor shall furnish the following reproducible diagrams:

- 7.1 Elementary diagram.
- 7.2 Connection diagram to external components.
- 7.3 Equipment list supplied with the panel.
- 7.4 Overall dimensions of panel.
- 7.5 Description of operation.
- 7.6 The above information can be on 8½ x 11 reproducible sheets. Hand sketches are acceptable.

Vendor Shall Supply

- 1. The successful Vendor shall supply to Bird and Son, Inc. six (6) sets of certified prints, parts lists, erection instructions, maintenance information and operation manuals.
- 2. Enough information to indicate he understands the requirements.
- 3. Price of all equipment, FOB plant at Shreveport, LA.
- 4. Delivery time.
- 5. Weight of equipment.

GENERAL CONDITIONS
AND
SPECIFICATIONS
FOR A
DUST CONTROL SYSTEM
AT
BIRD AND SON, INC.
SHREVEPORT, LOUISIANA

~~PROJECT:~~

Prepared by: Johns-Manville Sales Corporation
Industrial Environmental Engineering
Greenwood Plaza, P. O. Box 5108
Denver, Colorado 80217
303-770-1000

July 25, 1973

GENERAL CONDITIONS

1. General

The work to be done under this contract includes the obtaining of all necessary permits, furnishing all tools, equipment, labor and all materials (unless specifically omitted in these specifications or drawings) necessary to complete the installation of dust control piping and associated work all as outlined under Scope of Work below.

The quality of the work shall be as stipulated in these outline specifications. The Owner requires materials and workmanship equal to present good industrial construction.

The locations as given on the drawings are approximately correct, and it is understood that they are subject to such modification as may be found necessary or desirable at the time of installation in order to meet field conditions. Such changes shall be made by the Contractor without extra charge. All dimensions on the drawings shall be field checked before fabrication. This Contractor shall make all necessary changes without extra charge. If branch pipes are relocated and/or installed without approval of Owner, and improper sizing of main ducts results, the Contractor shall be required to remove and rebuild the duct section.

2. Scope of Work

The scope of work is outlined in detail in attached specifications but, in general, comprises the following:

- A. Erection of a cloth bag dust collector, fan and associated hoods and ductwork.
- B. Installation and hookup of a prewired electrical control panel.
- C. Installation of four footers under the dust collector to suit local conditions.

3. Work by Others

NONE

4. Schedule of Work

The work shall be carried on in accordance with the following schedule:

Work to start: one week after award of contract.

Complete all work:

5. Contractor's Work Schedule Must Coordinate with Plant Operation

The Owner will keep the plant in production during regular working hours. The Contractor shall arrange his work and schedule so that the Owner can continue to operate.

The Owner's operations must continue in essentially the same manner as present. The Contractor shall not remove any existing construction or create any openings that would endanger or inconvenience any of the Owner's employees without first receiving the approval of the Owner's Resident Engineer. All openings must be properly protected to the satisfaction of the Owner.

The Owner will cooperate to enable the Contractor to get as much work done as practical during the Contractor's normal working hours.

6. Contract

See Specifications for list of drawings.

7. Site Visit

The Contractor shall satisfy himself by personal examination of the job site and by such other means as to the actual conditions and requirements of the work and shall agree that there is no misunderstanding in regard to the nature or amount of work to be done.

The Contractor shall investigate existing obstructions which will interfere with construction operations, and examine all structures to which tie-ins are to be made.

8. Safety, Fire Protection and Clean-Up

The Contractor shall adhere strictly to all local, state, Federal, Bird and Son and insurance company safety and fire prevention rules and regulations. The construction area shall be kept reasonably clean and neat at all times.

9. Facilities and Services by Owner

The Owner will without charge supply the below listed services. The Owner will provide one outlet of each service at a location convenient to the work. However, the Contractor must maintain and extend the services he requires.

A. Drinking water.

B. Electrical service - 110 V/single phase/60 cycles and
460 V/three phase.

C. Other - none.

The Owner will make every reasonable effort to cooperate
with the Contractor.

A. The Owner will clear the work site of stored materials
and will make available to the Contractor uncovered
storage space.

10. Responsibility for Loss of Material

The Owner will not be responsible for the Contractor's loss
of tools, materials, etc. The Contractor must safeguard his
own property.

SPECIFICATIONS

I. Scope of Work

The locations as given on the drawings are approximately correct, and it is understood that they are subject to such modifications as may be found necessary or desirable at the time of installation in order to meet field conditions. The Contractor shall make all such changes as part of the contract. All dimensions on the drawings should be field checked before fabrications. Any relocation or resizing of mains or branch lines must have prior approval of the Resident Engineer.

The work shall consist of furnishing all labor, materials, equipment, tools, scaffolding, etc., required to install the following dust control system as called for in these specifications and as shown or noted on the following contract drawings:

<u>Drawing No.</u>	<u>Title</u>
35759-2	Dust Control System
35760-2	Hood Details
D-201.1-2	Duct Construction - Round (abrasive)
D-202.3-1	Elbows - Round
D-204.1	Clean-Out - End
D-217.1	Transition
D-218.1	Branch Entry
D-214.1	Hangers
D-209.1	Evasee

The following work is included:

- A. Move from storage area, erect and install a partially assembled cloth tube dust collector, as described in Section IV. It shall be erected on concrete footers furnished by this Contractor to suit local conditions.
- B. Move from storage area, erect and install on the mezzanine floor, a centrifugal fan, motor and drive unit as described in section IV.
- C. Move from storage area, install and electrically connect a prewired control panel supplied with the dust collector. Furnish all rigid conduit and wire as required to connect the panel to a power source and to the fan motor and the shaker motor. Connection shall be made to terminal strips in the panel. The actual location of the panel and the power source shall be determined at the time of visit to the plant site.

Also included is a manometer. This Contractor shall connect this gauge via two parallel runs of 1/2" copper tubing to the dust collector - one run to the clean air side and one run to the dirty side (hopper). The copper tubing shall be run symmetrically with walls and supports and tubing spacer brackets shall be used for a neat, workmanlike installation.

- D. Furnish all material, fabricate and install all hoods and ductwork as shown on the contract drawings listed above. Ducts shall be vertical and parallel to building surfaces, except where diagonal runs are shown.

II. Codes, Regulations, Etc.

The work shall comply with the applicable sections of governing local codes, laws and regulations. When the Contractor finds that the drawings and/or specifications are in conflict with the laws or codes, he shall notify the Resident Engineer who will render decision as to what action should be taken.

III. Description of Equipment Supplied by Owner

A. Cloth Dust Collector

The cloth dust collector will be an intermittent type with 1600 sq. ft. area of cotton cloth tubes. It will be partially factory assembled, with the following three components to be field connected:

1. Factory assembled housing with bags installed.
2. One (1) pyramidal hopper.
3. Four (4) support legs with bracing.

The total weight is about 5,000 lbs. With this unit will be included a pre-wired control panel containing all necessary components to operate the fan and shaker motor, plus a manometer.

B. Fan

The fan will be an industrial exhauster Arrangement 9, complete with motor, V-belt drive and guard factory mounted. This Contractor shall check the belt tension, alignment and lubrication.

IV. Equipment Installation

All items of mechanical equipment installed by the Contractor shall be installed in accordance with the manufacturer's instructions. The housing, cell platefloor, and hopper must be assembled so as to be completely leaktight. Plastic cement supplied by the manufacturer shall be installed in all joints, in addition to caulking materials.

This Contractor shall provide and install all miscellaneous iron and steel as required for the hanging, support, bracing or reinforcing of piping, ductwork or equipment. If upon receipt for installation equipment or parts thereof are damaged in any manner or fail to comply to the manufacturer's certified prints, equipment specifications or purchase order, the Contractor shall immediately advise the Engineer so that proper corrective measures may be taken.

Whenever possible, all driven machines shall be aligned and checked for free turning by hand after mounting. No machinery shall be operated by power without being properly aligned and lubricated.

V. Sheet Metal

General

1. Supporting Ducts

This Contractor shall provide and install all miscellaneous iron and steel as required for the hanging, support, bracing or reinforcing of hoods and ductwork. All horizontal sheet metal ducts shall be supported as shown on J-M Std. D-214.1. Supports shall be installed at least every 20 feet or where necessary to prevent sagging or vibration. Where a duct may be caused to move laterally by some machine the duct must be supported so as to prevent movement. All ducts shall be rigidly supported.

2. Dimensions

All duct or pipe dimensions specified on the drawings shall mean inside dimensions unless otherwise noted on the drawings.

3. Leaktightness

All sheet metal ducts and fittings shall be fabricated and assembled so as to be completely leaktight.

4. Burrs, Etc.

All ducts and fittings shall be smooth inside and outside.

All burrs, rough spots, turned-up edges or projections of any kind shall be removed or smoothed out. No pop rivets are allowed.

5. Material

All ducts and fittings that are continuously seam welded shall be made of black sheet steel. All ducts that are riveted shall be made of galvanized sheet steel.

Sheet metal gauges shall be in accordance with J-M Std. D-201.1-2 for abrasive dust systems.

6. Construction

All ducts or fittings of No. 16 gauge steel or heavier shall be welded. All ducts or fittings of less than No. 16 gauge sheet shall be soldered.

Ducts that are soldered shall be made in accordance with Std. D-201.1-2. All girth seams that are not continuously welded shall be taped with Nashua Corporation silver waterproof cloth tape No. 353. All longitudinal seams that are not continuously welded shall be soldered or taped with Nashua Corporation silver waterproof cloth tape No. 353.

7. Elbows

Elbows for round ductwork shall be made as shown on Std. D-202.3-1.

8. Cleanouts

Cleanouts shall be made as shown on Std. D-204.1.

9. Transitions

Transitions shall be made as shown on Std. D-217.1.

10. Branch Entries

Branch entries shall be made as shown on Std. D-218.1.

VI. Cutting, Patching and Flashing

All necessary cutting, patching and flashing of walls, floors, partitions, ceilings, roofs, etc., as required for the proper installation of the work under the contract shall be done at the Contractor's expense in a neat, workmanlike and careful manner and as approved by the Owner.

No joist, beams, girders, or columns shall be cut, drilled or welded upon by any Contractor without first obtaining the written permission of the Owner, unless specifically called for on the contract drawings.

All drilling and patching for expansion bolts, shields, hangers and other supports shall be done by this Contractor, subject to the approval of the Owner. Labor and material required to replace or refinish parts, cut or injured, shall be furnished at this Contractor's expense, subject to the satisfaction of the Owner.

VII. Testing and Approval

After the collector is completely assembled and in operating order, it shall be placed under suction by the fan. All leaks in the hoppers, casings and cell plate floor shall be found and repaired. Leaks shall be found by walking over the collector roof, entering the collector casing and hopper and listening for leaks, running the hand over the seams, and using soap bubble tests where required. The Contractor shall be required to repair all leaks to the Owner's satisfaction.

Leaks in piping shall be similarly determined and repaired.

Tests made by the Owner shall determine that air flows in all branch pipes of the systems are as designed. Any flows that are off due to poor workmanship or foreign materials and/or projections into the pipes shall be repaired by the Contractor at no extra expense to the Owner.

All equipment shall be operated under power for a period of at least eight (8) hours continuously. Any defects that show up such as poor alignment of drives, binding at bearings, or any other difficulty in operation that is traceable to this Contractor's installation shall be repaired by him at once at no extra cost to the Owner.

Final acceptance of entire installation shall be withheld until Owner's Engineer gives his approval.

VIII. Removal of Waste Material, Equipment, Etc.

The Contractor shall keep the aisles and working spaces free of litter and debris.

Discarded equipment shall be promptly removed and shall not interfere with plant operation.

IX. Safety Rules

The Contractor shall strictly adhere to Bird and Son, Inc. rules at all times and comply with the Safety Engineer's requirements.

X. Approval of Drawing Changes

Should field conditions require any change in the drawings, the Contractor shall prepare a sketch showing the change and submit it for approval to the Resident Engineer.

XI. Painting

The Contractor shall furnish and apply one prime coat of paint to the outside of all black iron sheet metal hangers and supports that he installs. After installation, he shall touch up as required to complete the application. The Contractor shall not paint galvanized sheet metal except where the galvanizing may have been burned off or removed at fabrication or installation.

XII. Unit Cost of Extra Work

The Contractor shall submit a unit cost, based upon the weight of different gauges of metal, for determining the cost of all extras.

ASSEMBLY AND OPERATING INSTRUCTIONS

#800 SERIES STANDARD DUST COLLECTOR

2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING # DC-3246

ERECTION PROCEDURE

Check Shipping List against material received.

Study the Assembly Drawing and read Instructions carefully before starting erection.

All bolts should be assembled loosely initially and then tightened when the entire unit is completely assembled.

Coat all joints with a thick layer of plastic cement as furnished.

- STEP #1: Assemble the hoppers. On units containing more than one hopper, a hopper filler bar (Part #723) must be installed between each adjoining hopper.
- STEP #2: The two intermediate side channels (Part #713-) and two intermediate end channels (Part #715) are bolted around the top perimeter of the hoppers.
- STEP #3: The hoppers, together with the intermediate channels, are then hoisted up and lowered into place on top of the structural support.
- STEP #4: Bolt the bottom flange of the intermediate channels to the top flange of the support channels.
- STEP #5: At this point all the hopper and channel bolts may be tightened.
- STEP #6: Determine the end at which the access door is to be located. The door sheet (Part #303) may be installed at either end of the Dust Collector.
- STEP #7: At each of the four corners install one side sheet (Part #301) and one corner sheet (Part #302) either right or left hand as noted. Include side clips (Part #304). It is better to put all the bolts in loose and tighten them after the whole Dust Collector shell is assembled.
- STEP #8: Install upper side angles (Part #710- and #756-) and upper end pitch angles (Part #755R and #755L).
- STEP #9: Install side sheets (Part #301) and door sheet (Part #303) with

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INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STD. DUST COLL. SUB. 1-1-51

DR. BY *[Signature]* APP'D

DATE *[Date]*

SCALE

ORDER NO.

DWG. NO.

RECEIVED 1951

BIRD 016887

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STANDARD DUST COLLECTOR
#2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING #DC-3246

ERECTION PROCEDURE - #2

vertical clips (Part # 04) as noted. One tube sheet should be installed with every set of side sheets: this makes for easier erection and accessibility. Do not forget the tube clips (Part #712).

- STEP #10: Install the shaker frame hanger bearings (Part #663) as noted with the proper bolts and lock washers. Be sure they are firmly installed.
- STEP #11: Install the end top sheets (Part #706) and the center top sheets (Part #705) together with the top clips (Part #311).
- STEP #12: Install the shaker drive support (Part #714) in the locations as noted when installing the top sheets. Note that the supports are fastened to the top sheets.
- STEP #13: Tighten all bolts.
- STEP #14: Install the linkage adapters (Part #762) into the shaker frames using both cut washers and lock washers.
- STEP #15: Slip the Nylon bushings over the shaker frame shafts. Put a coating of grease on shafts and bushings before installing. Install the shaker frames in the hanger bearings.
- STEP #16: Install the shaker motor, crank shaft, ball bearings, V-belt drive and connecting rods. Be sure the connecting rods are well lubricated.
- STEP #17: Install the connecting linkage as noted. Oil each connecting pin. Leave off the V-belt and turn the large sheave by hand to check for correct alignment of the crank shaft, bearings and connecting rods and against binding of these parts and the linkage. Adjust the connecting rods so that the assembly operates freely. The whole assembly should turn freely.
- STEP #18: Install the tubes. The tubes slip over the hooks and clamp to the tube sheet collars. Be sure the tubes hang straight without any twist. The tubes should be clamped tight at the bottom to prevent leakage. The clamps are adjustable to the various tube fabrics. The tubes should hang very loosely. If the tubes are tight the shaking mechanism will not work. Check for shrinkage. When the tubes are laid out on a flat surface they should measure 13 1/2" long from inside of loop at top of rod without stretching.

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INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS

#800 SERIES STD. DUST COLL. SHE 2 OF 4

DR. BY	APP'D	DATE	SCALE
ORDER NO.	DWG. NO.		

172524 1904

ASSEMBLY AND OPERATING INSTRUCTIONS
#600 SERIES STANDARD DUST COLLECTOR
#2-600 - INTERMITTENT DUTY - ASSEMBLY DRAWING #DC-3246

ERECTION PROCEDURE - #3

STEP #19: Check shaking mechanism by hand again. When the entire assembly works freely install V-belt and tighten by adjusting the motor.

The Dust Collector is now ready for operation and should give troublefree performance for a long time.

PIPING CONNECTIONS

The dirty air piping may be connected to the hoppers or the plenum chamber between the base angles and the tube sheets. Maximum opening between each side sheet 12 inches high by 24 inches wide.

The dirty air connections should enter horizontally. While it is not necessary, a 1/4 inch steel baffle plate* may be installed on the inside to deflect the dust downwards.

The clean air connection may be made on any of the top sheets to suit.

MAINTENANCE

Once a week --

Check for dust leaks;
Check shaking mechanism;
Check V-belt drive.

Keep shaking mechanism well greased.

WARNING:

Keep open lights from inside of Collector.

Do not use cutting or welding torches on Collector after tubes are installed.

The fan motor and shaker motor must be interlocked so that the shaker motor cannot operate when the fan is running.

An adjustable timer* is available that operates as follows:

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INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS

#600 SERIES STD. DUST COLL. SHIT 3 OF 4

DR. BY *P. J. J.* APP'D

DATE - *11-1-58* SCALE

ORDER NO.

DWG. NO.

DIETZGEN 1958H

BIRD 016889

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STANDARD DUST COLLECTOR
#2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING # DC-3246

ERECTION PROCEDURE - #4

Fan motor manually stopped:
Time delay for fan to stop running (adjustable 0 - 5 minutes)
Shaker motor started:
Shakers operate (adjustable 0 - 5 minutes):
Fan motor manually started.

MANOMETER

A manometer* (to measure the pressure drop across the tubes) is available, complete with fittings. The two extra holes in the door sheet are for the connection of the manometer fittings. If not used they can be plugged with bolts.

OPERATION

Shake Dust Collector Tubes at least twice a day or oftener when necessary.

* Baffle plate, timer and manometer not normally furnished.

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INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STD. DUST COLL. SHT. 4 of 4

DR. BY F.R. | APP'D

DATE 12.7.54 | SCALE

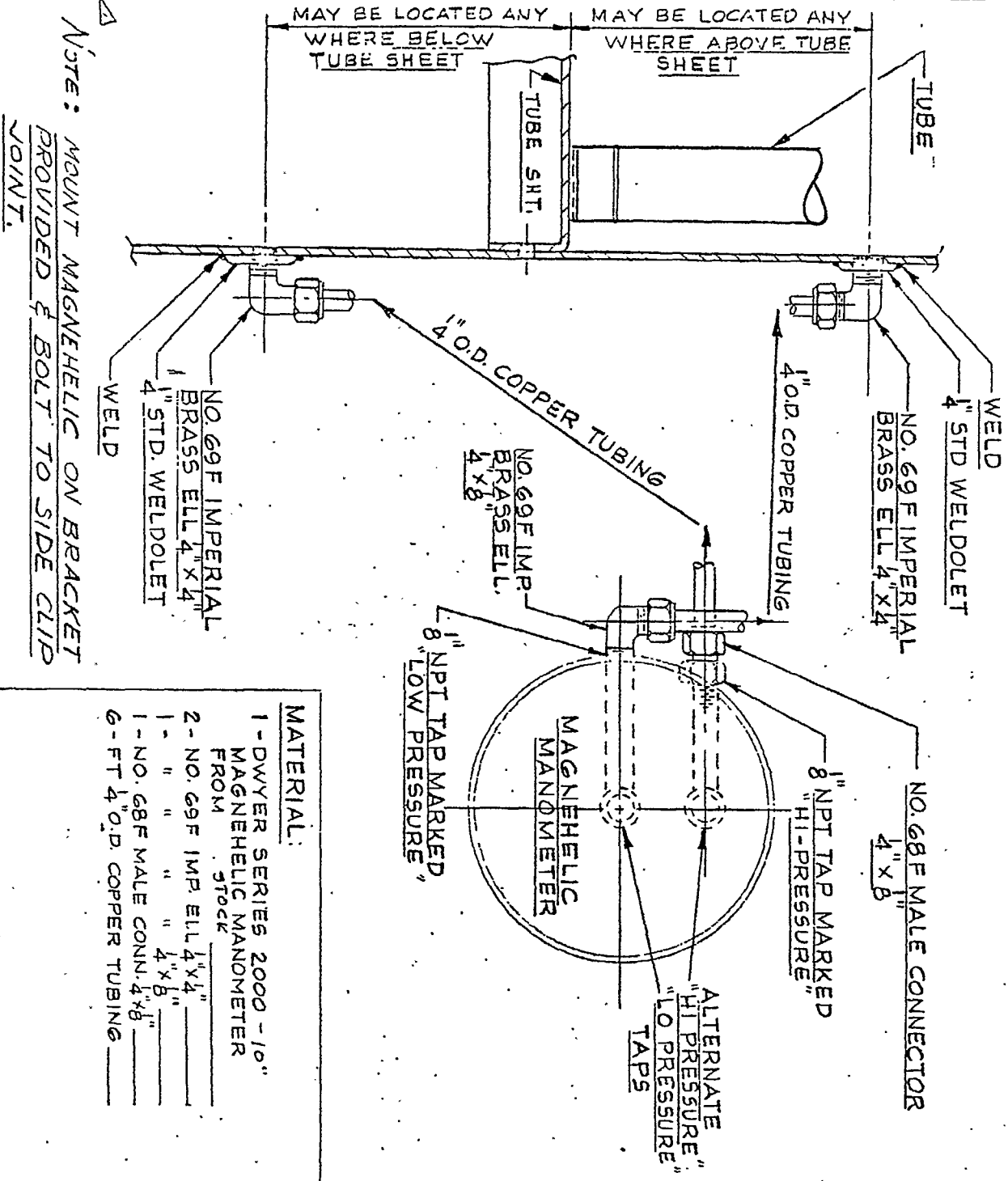
ORDER NO.

DWG. NO.

DIETZGEN 1954

BIRD 016890

△ MOUNTING NOTE ADDED 8-1-73 JAR



- MATERIAL:**
- 1 - DWYER SERIES 2000 - 10" MAGNEHELIC MANOMETER FROM STOCK
 - 2 - NO. 69F IMP. ELL 4"x4"
 - 1 - " " " 4"x8"
 - 1 - NO. 68F MALE CONN. 4"x8"
 - 6 - FT 4" O.D. COPPER TUBING

INDUSTRIAL CLEAN AIR, INC.
Environmental Control
ICA
 BERKELEY, CALIFORNIA 94710
 LOS ANGELES, CALIFORNIA 90011

SCALE NONE	MAGNEHELIC MANOMETER FOR MODULAR SERIES DUST COLLECTORS	
DATE 4-26-73		
DWN. R.O.B.	ORDER NO.	DRAWING NO.
CHK'D J.S.		DCLS-133-2

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800 SERIES DUST COLLECTORS
RECOMMENDED SPARE PARTS LIST

48	<u>#1665134 POLYGRADE</u>	\$ <u>7.15</u>	+ each
48	_____		_____ each
48	#88 "Snap-Lock" Worm Gear Tube Clamps		2.00 each

SHAKING MECHANISM

1	Crankshaft - #700 AE	\$	100.00 each
2	Connecting Rod, Adjustable - #600 AE 1 & 2		60.00 each
2	A-35 V-Belts, I. S. Shaker		4.00 each
2	A-43 V-Belts, O. S. Shaker		5.00 each
1	3/4 HP Motor (TE)		115.00 each
2	1" Ball Bearings #S&-100		13.00 each
16	16-SN-24 Nylon Bushing		1.00 each
8	Shaker Frame Hanger #663		7.00 each
2	Linkage #L-1		14.00 each
8	Linkage Adapters #762		11.00 each
8	3/4" x 2-1/2" Shoulder Bolts		5.50 each
9	Flexlox-Nut 5/8"		2.00 each

SEE NEXT PAGE FOR ORDERING INSTRUCTIONS

INDUSTRIAL CLEAN AIR, INC. Environmental Control BERKELEY, CALIFORNIA 94710 LOS ANGELES, CALIFORNIA 90011	SCALE	800 Recommended Spare Parts List	
	DATE 1/24/74		
	DWG.	ORDER NO.	DRAWING NO.
	CHK'D JHE		Page 1 of 2

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800 SERIES DUST COLLECTOR
RECOMMENDED SPARE PARTS LIST

ALL ORDERS FOR PARTS SHOULD INCLUDE:

1. ICA SERIAL NUMBER
2. EQUIPMENT DESCRIPTION (MODEL)
3. NAME OF CUSTOMER, DATE OF PURCHASE,
PART DESCRIPTION AND NUMBER

ALL PRICES F.O.B. BERKELEY, CALIFORNIA

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TERMS: NET 30 DAYS

CONTACT FACTORY SALES OR YOUR LOCAL ICA REPRESENTATIVE
FOR CURRENT PRICE AND DISCOUNT SCHEDULE

SHIPMENT OF ANY OF THE ABOVE ITEMS TWO (2) WEEKS AFTER
RECEIPT OF ORDER

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ICA Environmental Control
BERKELEY, CALIFORNIA 94710
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SCALE

DATE

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800 Recommended Spare
Parts List

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DRAWING NO.

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2	A-43 V-Belts, O. S. Shaker	5.00	each
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LOS ANGELES, CALIFORNIA 90011

SCALE	800 Recommended Spare Parts List	
DATE 1/24/74		
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ICA Environmental Control
BERKELEY, CALIFORNIA 94710
LOS ANGELES, CALIFORNIA 90011

SCALE

DATE
1/24/74

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800 Recommended Spare
Parts List

ORDER NO.

DRAWING NO.

Page 2 of 2

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RECOMMENDED SPARE PARTS LIST

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48	_____	_____ each
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INDUSTRIAL CLEAN AIR, INC.
ICA Environmental Control
BERKELEY, CALIFORNIA 94710
LOS ANGELES, CALIFORNIA 90011

SCALE	800 Recommended Spare Parts List	
DATE 1/24/74	ORDER NO.	DRAWING NO.
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RECEIPT OF ORDER

INDUSTRIAL CLEAN AIR, INC.
ICA Environmental Control
BERKELEY, CALIFORNIA 94710
LOS ANGELES, CALIFORNIA 90011

SCALE

DATE
1/24/74

DWN.

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800 Recommended Spare
Parts List

ORDER NO.

DRAWING NO.

Page 2 of 2

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ASSEMBLY AND OPERATING INSTRUCTIONS

#800 SERIES STANDARD DUST COLLECTOR

#2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING # DC-7206

ERECTION PROCEDURE

Check Shipping List against material received.

Study the Assembly Drawing and read Instructions carefully before starting erection.

All bolts should be assembled loosely initially and then tightened when the entire unit is completely assembled.

Coat all joints with a thick layer of plastic cement as furnished.

- STEP #1: Assemble the hoppers. On units containing more than one hopper, a hopper filler bar (Part #723) must be installed between each adjoining hopper.
- STEP #2: The two intermediate side channels (Part #713-) and two intermediate end channels (Part #715-) are bolted around the top perimeter of the hoppers.
- STEP #3: The hoppers, together with the intermediate channels, are then hoisted up and lowered into place on top of the structural support.
- STEP #4: Bolt the bottom flange of the intermediate channels to the top flange of the support channels.
- STEP #5: At this point all the hopper and channel bolts may be tightened.
- STEP #6: Determine the end at which the access door is to be located. The door sheet (Part #303) may be installed at either end of the Dust Collector.
- STEP #7: At each of the four corners install one side sheet (Part #301) and one corner sheet (Part #302) either right or left hand as noted. Include side clips (Part #304). It is better to put all the bolts in loose and tighten them after the whole Dust Collector shell is assembled.
- STEP #8: Install upper side angles (Part #710- and #756-) and upper end pitch angles (Part #755R and #755L).
- STEP #9: Install side sheets (Part #301) and door sheet (Part #303) with

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Rees Blow Pipe Mfg. Co.
INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS

#800 SERIES STD. DUST COLL. SH. 1 of 1

DR. BY <u>R.R.</u>	APP'D	DATE <u>1-1-74</u>	SCALE
ORDER NO.	DWG. NO.		

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STANDARD DUST COLLECTOR
2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING # DC-3246

ERECTION PROCEDURE - #2

vertical clips (Part # 04) as noted. One tube sheet should be installed with every set of side sheets; this makes for easier erection and accessibility. Do not forget the tube clips (Part #712).

- STEP #10: Install the shaker frame hanger bearings (Part #663) as noted with the proper bolts and lock washers. Be sure they are firmly installed.
- STEP #11: Install the end top sheets (Part #706) and the center top sheets (Part #705) together with the top clips (Part #811).
- STEP #12: Install the shaker drive support (Part #714) in the locations as noted when installing the top sheets. Note that the supports are fastened to the top sheets.
- STEP #13: Tighten all bolts.
- STEP #14: Install the linkage adapters (Part #762) into the shaker frames using both cut washers and lock washers.
- STEP #15: Slip the Nylon bushings over the shaker frame shafts. Put a coating of grease on shafts and bushings before installing. Install the shaker frames in the hanger bearings.
- STEP #16: Install the shaker motor, crank shaft, ball bearings, V-belt drive and connecting rods. Be sure the connecting rods are well lubricated.
- STEP #17: Install the connecting linkage as noted. Oil each connecting pin. Leave off the V-belt and turn the large sheave by hand to check for correct alignment of the crank shaft, bearings and connecting rods and against binding of these parts and the linkage. Adjust the connecting rods so that the assembly operates freely. The whole assembly should turn freely.
- STEP #18: Install the tubes. The tubes slip over the hooks and clamp to the tube sheet collars. Be sure the tubes hang straight without any twist. The tubes should be clamped tight at the bottom to prevent leakage. The clamps are adjustable to the various tube fabrics. The tubes should hang very loosely. If the tubes are tight the shaking mechanism will not work. Check for shrinkage. When the tubes are laid out on a flat surface they should measure 12.1" long from inside of loop at top of rod without stretching.

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LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STD. DUST COLL. SHE. 2 of 4

DR BY F. R. APP'D

DATE 1.17.7. SCALE

ORDER NO.

DWG. NO.

DIETZGEN 1984

BIRD 016899

ASSEMBLY AND OPERATING INSTRUCTIONS
#200 SERIES STANDARD DUST COLLECTOR
#2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING #DC-3246

ERECTION PROCEDURE - #3

STEP #19: Check shaking mechanism by hand again. When the entire assembly works freely install V-belt and tighten by adjusting the motor.

The DustCollector is now ready for operation and should give troublefree performance for a long time.

PIPING CONNECTIONS

The dirty air piping may be connected to the hoppers or the plenum chamber between the base angles and the tube sheets. Maximum opening between each side sheet 12 inches high by 24 inches wide.

The dirty air connections should enter horizontally. While it is not necessary, a 1/4 inch steel baffle plate* may be installed on the inside to deflect the dust downwards.

The clean air connection may be made on any of the top sheets to suit.

MAINTENANCE

Once a week --

Check for dust leaks;
Check shaking mechanism;
Check V-belt drive.

Keep shaking mechanism well greased.

WARNING:

Keep open lights from inside of Collector.

Do not use cutting or welding torches on Collector after tubes are installed.

The fan motor and shaker motor must be interlocked so that the shaker motor cannot operate when the fan is running.

An adjustable timer* is available that operates as follows:

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Rees Blow Pipe Mfg. Co.
INCORPORATED

BERKELEY, CALIF.

LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS

#200 SERIES STD. DUST COLL. SH. 3 of 4

DR. BY F. J. S. APP'D

DATE: 11-1-53 SCALE

ORDER NO.

DWG. NO.

DIETZGEN 100H

BIRD 016900

ASSEMBLY AND OPERATING INSTRUCTIONS
#800 SERIES STANDARD DUST COLLECTOR
#2-800 - INTERMITTENT DUTY - ASSEMBLY DRAWING #DC-3246

ERECTION PROCEDURE - #4

Fan motor manually stopped;
Time delay for fan to stop running (adjustable 0 - 5 minutes)
Shaker motor started;
Shakers operate (adjustable 0 - 5 minutes);
Fan motor manually started.

MANOMETER

A manometer* (to measure the pressure drop across the tubes) is available, complete with fittings. The two extra holes in the door sheet are for the connection of the manometer fittings. If not used they can be plugged with bolts.

OPERATION

Shake Dust Collector Tubes at least twice a day or oftener when necessary.

* Baffle plate, timer and manometer not normally furnished.

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Rees Blow Pipe Mfg. Co.
INCORPORATED

BERKELEY, CALIF.

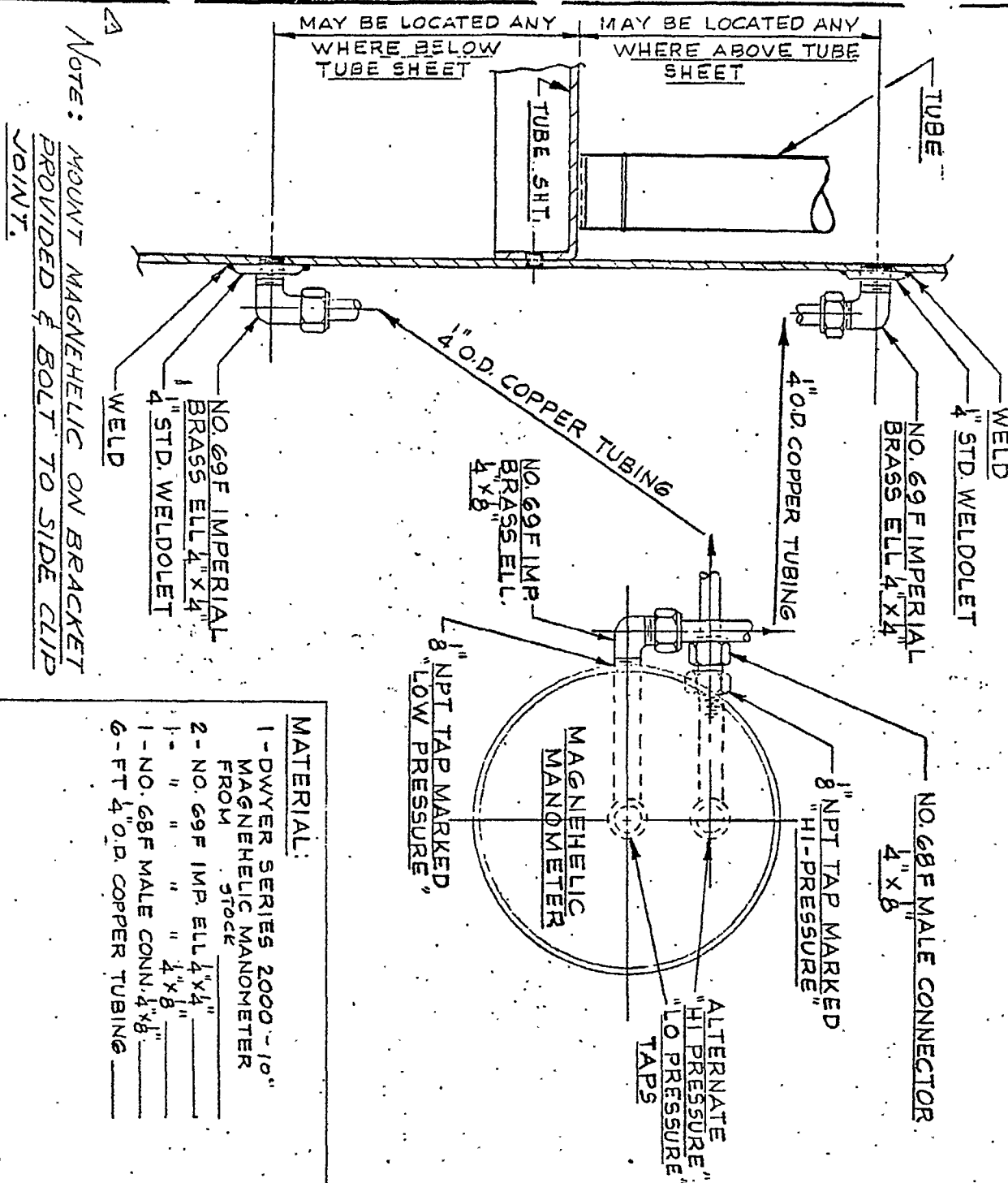
LOS ANGELES, CALIF.

ASSEMBLY AND OPERATING INSTRUCTIONS			
#800 SERIES STD. DUST COLL. SHT. 4 OF 4			
DR. BY F.E.	APP'D	DATE 1-17-74	SCALE
ORDER NO.		DWG. NO.	

DIETZGEN 100H

BIRD 016901

Δ MOUNTING NOTE ADDED 8-1-73 JAR



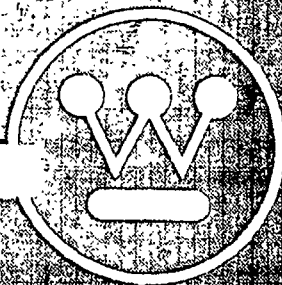
MATERIAL:

- 1-DWYER SERIES 2000-10" MAGNEHELIC MANOMETER FROM STOCK
- 2-NO. 69F IMP. ELL 4" X 4" 1" STD. WELDOLET
- 1-NO. 68F MALE CONN. 4" X 8"
- 6-FT 4" O.D. COPPER TUBING

INDUSTRIAL CLEAN AIR, INC.
ICA
 Environmental Control
 BERKELEY, CALIFORNIA 94710
 LOS ANGELES, CALIFORNIA 90011

SCALE NONE	MAGNEHELIC MANOMETER FOR MODULAR SERIES DUST COLLECTORS	
DATE 4-26-73	ORDER NO.	DRAWING NO. DCLS-133-2
DWN. R.O.B.		
CHKD J.F.		

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Westinghouse
Sturtevant
Division

SUPERQUICK

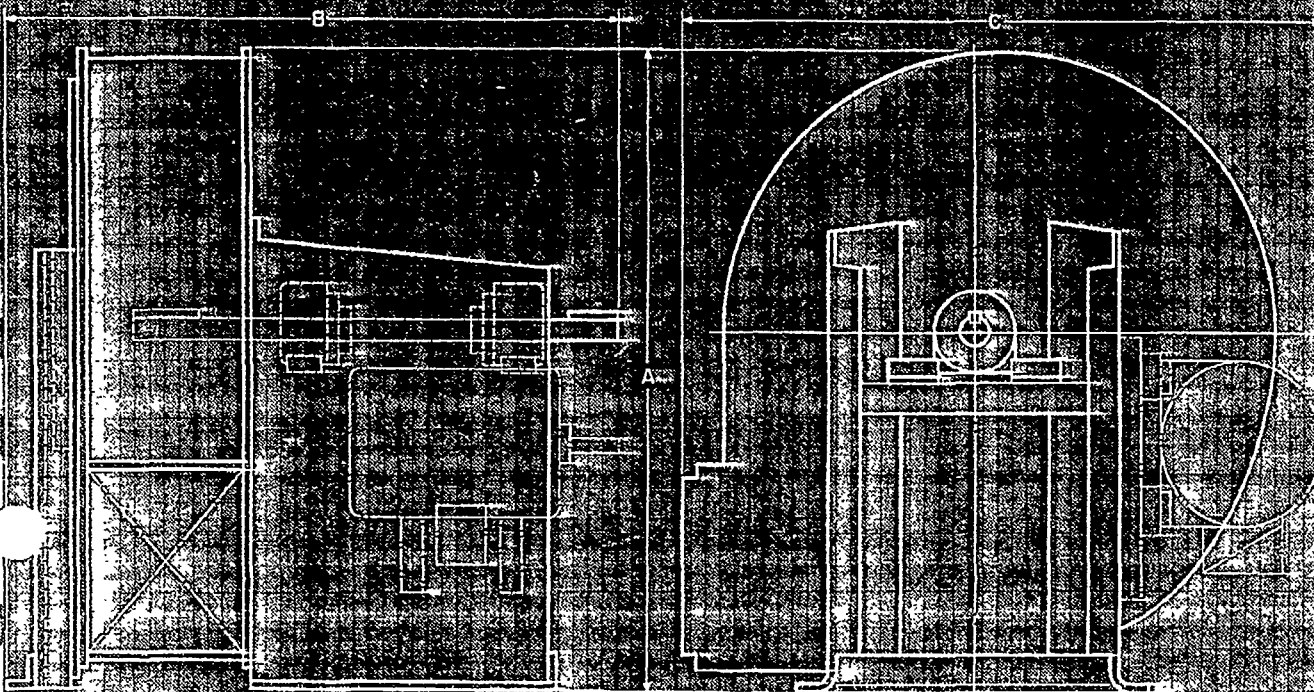
5

DAY

SHIPMENT

OF

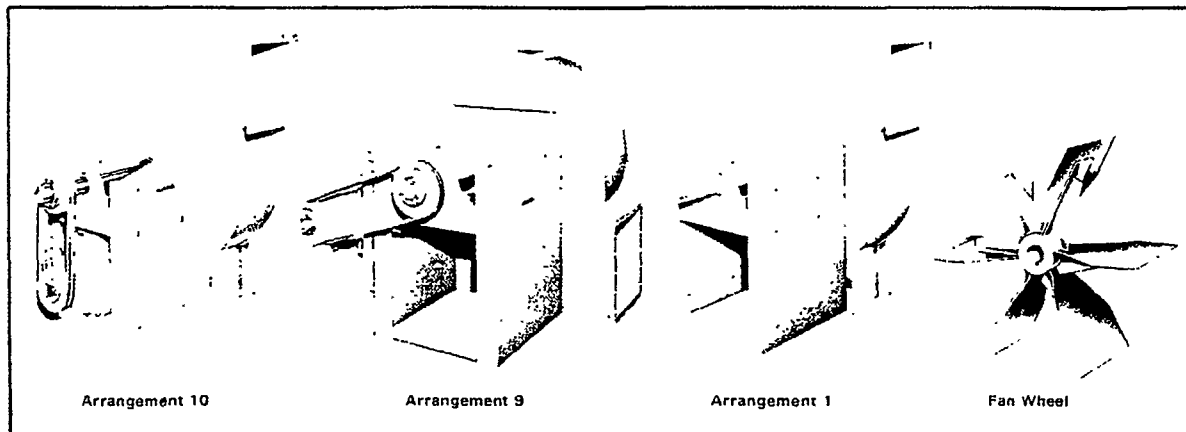
**WESTINGHOUSE
HEAVY DUTY
INDUSTRIAL
FANS**



Westinghouse



S400M Industrial Fans



What is Available

- 8 sizes of S400M industrial fans
- air volumes to 15000 CFM
- static pressures to 20" water gauge
- air temperatures to 450°F
- optional extra cost inlet flange, outlet flange, open & enclosed motor, V-drive, belt guard, weathercover.

Quick Selector

Fan & motor sizes are based on air at 70°F and sea level. Request catalog 1151 for complete fan performance data.

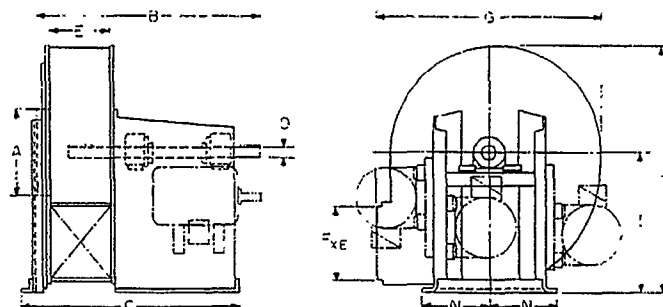
CFM	2" SP		4" SP		8" SP		12" SP		16" SP		20" SP	
	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor
500	S407M	1HP*	S407M	1HP*	S407M	2HP	S407M	2HP	—	—	—	—
1000	S409M	1HP*	S407M	2HP	S407M	3HP	S407M	5HP	S407M	5HP	S407M	7 1/2 HP
1500	S409M	2HP	S409M	2HP	S409M	5HP	S409M	5HP	S407M	7 1/2 HP	S407M	10HP
2000	S411M	2HP	S411M	3HP	S409M	5HP	S409M	7 1/2 HP	S409M	10HP	S409M	15HP
2500	S411M	3HP	S411M	5HP	S411M	7 1/2 HP	S411M	10HP	S411M	15HP	S411M	15HP
3000	S413M	3HP	S413M	5HP	S411M	7 1/2 HP	S411M	10HP	S411M	15HP	S411M	20HP
3500	S413M	3HP	S413M	5HP	S413M	10HP	S413M	15HP	S411M	15HP	S411M	20HP
4000	S415M	3HP	S415M	5HP	S415M	10HP	S413M	15HP	S413M	20HP	S413M	25HP
4500	S415M	5HP	S415M	7 1/2 HP	S415M	10HP	S415M	15HP	S413M	20HP	S413M	25HP
5000	S417M	5HP	S417M	7 1/2 HP	S415M	15HP	S415M	20HP	S415M	25HP	S413M	30HP
6000	S417M	5HP	S417M	10HP	S417M	15HP	S417M	20HP	S415M	30HP	S415M	40HP
7000	S419M	7 1/2 HP	S419M	10HP	S417M	20HP	S417M	25HP	S417M	30HP	S417M	40HP
8000	S419M	7 1/2 HP	S419M	15HP	S419M	20HP	S417M	30HP	S417M	40HP	S417M	50HP
9000	S421M	7 1/2 HP	S421M	15HP	S421M	20HP	S419M	30HP	S419M	40HP	S419M	50HP
10000	S421M	10HP	S421M	15HP	S421M	25HP	S419M	40HP	S419M	50HP	S419M	60HP†
11200	S421M	15HP	S421M	20HP	S421M	30HP	S421M	40HP	S419M	50HP	S419M	60HP†
12500	S421M	15HP	S421M	20HP	S421M	30HP	S421M	50HP	S421M	60HP†	S421M	75HP†

†60 and 75HP motors—not available from stock and cannot be factory mounted for shipment.
*Order 2HP motor

Sturtevant Division

Dimensions and Weights

Do not use for construction purposes.
Request Dimension Sheet 1151 for exact
and complete dimensions



(Approximate Dimensions Shown)

Fan Size	Eff Wheel Dia	A	B	C	D	E	F	G	H	I	N	Wt. lbs	Max Motor Hp Arr 9	Max Motor Hp Arr 10
S407M	12 $\frac{1}{2}$	7	25 $\frac{11}{16}$	—	1 $\frac{1}{16}$	6 $\frac{1}{2}$	6 $\frac{1}{2}$	22 $\frac{1}{2}$	26 $\frac{9}{16}$	17	9 $\frac{3}{16}$	142	3	2
S409M	15 $\frac{1}{2}$	9	27 $\frac{1}{2}$	—	1 $\frac{1}{16}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	24 $\frac{1}{2}$	28 $\frac{13}{16}$	17 $\frac{1}{2}$	9 $\frac{3}{16}$	172	3	2
S411M	19 $\frac{1}{2}$	11	36 $\frac{1}{2}$	—	1 $\frac{1}{16}$	9 $\frac{1}{2}$	10 $\frac{1}{2}$	29 $\frac{1}{2}$	35 $\frac{1}{2}$	21 $\frac{1}{2}$	10 $\frac{3}{16}$	254	20	10
S413M	22 $\frac{1}{2}$	13	38 $\frac{3}{4}$	—	1 $\frac{1}{16}$	11 $\frac{1}{2}$	12 $\frac{1}{2}$	29 $\frac{1}{2}$	37 $\frac{1}{2}$	21	10 $\frac{3}{16}$	322	20	10
S415M	26 $\frac{1}{2}$	15	43 $\frac{1}{16}$	44 $\frac{1}{2}$	1 $\frac{1}{16}$	12 $\frac{1}{2}$	14 $\frac{1}{16}$	40 $\frac{1}{16}$	43	24 $\frac{1}{2}$	13	432	30	20
S417M	29 $\frac{1}{2}$	17	48	49 $\frac{1}{2}$	2 $\frac{1}{16}$	14 $\frac{1}{2}$	16 $\frac{1}{16}$	45	49	27 $\frac{1}{2}$	13 $\frac{1}{2}$	539	50	20
S419M	33	19	49 $\frac{1}{16}$	51 $\frac{1}{16}$	2 $\frac{1}{16}$	16 $\frac{1}{16}$	18 $\frac{1}{2}$	49 $\frac{1}{16}$	64 $\frac{1}{16}$	31	13 $\frac{1}{2}$	728	50	30
S421M	36 $\frac{1}{2}$	21	54 $\frac{1}{2}$	57 $\frac{1}{2}$	2 $\frac{1}{16}$	18	20	54 $\frac{1}{2}$	60 $\frac{1}{16}$	34 $\frac{1}{2}$	14 $\frac{1}{2}$	920	75	30

*Cannot be factory mounted for shipment

Shipment

• Standard S400M Fans with optional inlet flange, outlet flange, and shaft cooling device will be shipped within 5 working days after receipt of a complete order at Hyde Park, Mass.

• S400M Fans with a listed motor-drive-belt guard or weathercover package will be shipped within 15 working days after receipt of a complete order at Hyde Park, Mass.

The Superquick 400M Program

The most popular sizes and accessories of Westinghouse Series 400 Industrial Fans are now in stock at Hyde Park, Mass. Selected motors are also stocked to allow SUPERQUICK shipment on a wide selection of fans and drives.

Description of S400M Fans

Series S400M Superquick Fans feature all steel construction for ruggedness and severe duty. The radial bladed wheel is excellent for all applications handling dusts, granular materials, long fibers, air, fumes, or vapors. Fans are supplied in arrangement 1, 9, or 10 to meet varying job requirements.

Fan arrangement 1 is designed for use with a floor mounted separate motor. There is no restriction on motor size. Both motor and V-drive usually are supplied by the purchaser.

Fan arrangement 9 includes motor mounting rails on the outside of the bearing sub-base and provides a complete and compact fan and motor package.

Fan arrangement 10 is similar to arrangement 9 except the motor is mounted on the inside of the sub-base.

Arrangement 10 fans usually are preferred if the required motor will fit physically within the sub-base. Arrangement 9 fans can accommodate larger motors. A complete factory mounted motor-drive-guard package usually is supplied with arrangement 9 or 10 fans. The guard used on arrangement 10 fans is a weathercover which protects shaft, bearings, drive, and motor and provides complete safety for the operator.

Standard Fans

Available in sizes S407M, S409M, S411M, S413M, S415M, S417M, S419M and S421M. All with quick-opening access door, drain connection, and painted with red zinc chromate iron oxide primer. All sizes are available as either clockwise or counter-clockwise rotation, top horizontal, up blast, or bottom horizontal discharge, and arrangement 1, 9 or 10. Air temperature range is -20°F to 350°F.

Accessories

Extra cost accessories include inlet flange, outlet flange, spare wheel, and a special

shaft cooling device that allows the fan to handle air temperatures up to 450°F.

Drive Packages

Motors are Westinghouse, 1800 rpm, T-frame, ball bearing, 3-60-230/460, either Open/Dripproof or Totally Enclosed. Available from stock in horsepower of 2, 3, 5, 7 $\frac{1}{2}$, 10, 15, 20, 25, 30, 40 or 50.

V-drives are adjustable speed type for motors 7 $\frac{1}{2}$ hp or smaller and constant speed type for motors 10 hp and greater. All drives have a rated power transmission capacity at least 1.4 times the motor nameplate rating.

Drive guards for arrangement 9 fans totally enclose the V-drive on all sides. The fan shaft and motor are not enclosed. The arrangement 10 drive guard is a weather cover enclosing and protecting motor, drive bearings and fan shaft.

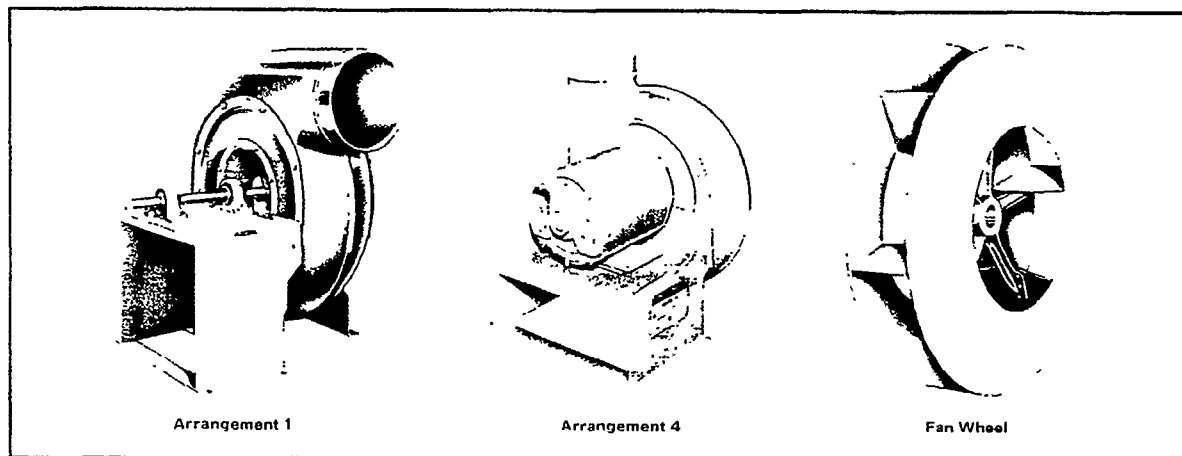
Weight (Motor-Drive-Guard Package)

HP	O/DP. lbs	TFEC. lbs
2	68	75
3	82	100
5	100	120
7 $\frac{1}{2}$	130	220
10	165	240
15	330	340
20	360	370
25	500	515
30	550	570
40	715	790
50	790	875

Westinghouse



S500 Cast Iron Industrial Fans



What is Available

- 6 sizes of S500 cast iron industrial fans, arrangement 1 (motor and V-drive mounted separately)
- 4 sizes of S500 cast iron industrial fans, arrangement 4, 3600 rpm motors (fan wheel mounted directly on motor shaft)
- 2 sizes of S500 cast iron industrial fans, arrangement 4, 1800 rpm motors (fan wheel mounted directly on motor shaft)
- air volumes to 2000 CFM
- static pressures to 12" water gauge
- air temperatures to 450°F.

Quick Selector

Fan sizes and minimum motor horsepowers are based on air at 70°F and sea level. Request catalog 1130-3 for complete fan performance data.

A. Arrangement 1

CFM	2" SP		4" SP		6" SP		8" SP		10" SP		12" SP	
	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor	Fan	Motor
100	S504	0.1 HP	S504	0.2 HP	S504	0.3 HP	S504	0.4 HP	—	—	—	—
200	S504	0.2 HP	S504	0.3 HP	S504	0.4 HP	S504	0.5 HP	—	—	—	—
400	S505	0.4 HP	S505	0.6 HP	S505	0.8 HP	S505	1.0 HP	S505	1.3 HP	—	—
600	S506	0.5 HP	S506	0.8 HP	S506	1.2 HP	S506	1.5 HP	S506	1.8 HP	—	—
800	S507	0.6 HP	S507	1.0 HP	S507	1.4 HP	S507	1.7 HP	S507	2.0 HP	—	—
1000	S509	0.7 HP	S509	1.2 HP	S509	1.6 HP	S509	2.1 HP	S509	2.6 HP	S509	3.2 HP
1200	S510	0.9 HP	S510	1.3 HP	S510	1.8 HP	S510	2.4 HP	S510	2.9 HP	S510	3.5 HP
1500	S510	1.3 HP	S510	1.9 HP	S510	2.5 HP	S510	3.1 HP	S510	3.6 HP	S510	4.3 HP
1750	S510	1.9 HP	S510	2.5 HP	S510	3.1 HP	S510	3.8 HP	S510	4.5 HP	S510	5.3 HP
2000	S510	2.5 HP	S510	3.2 HP	S510	4.0 HP	S510	4.7 HP	S510	5.5 HP	S510	6.3 HP

B. Arrangement 4, 3600 rpm Motor

Fan Size	1" SP	2" SP	4" SP	6" SP	8" SP
S504	435 CFM	362 CFM	176 CFM	—	—
S505	760 CFM	690 CFM	500 CFM	225 CFM	—
S506	1225 CFM	1130 CFM	920 CFM	640 CFM	—
S507	(Motor Overload at 1" & 2" SP)	1540 CFM	1275 CFM	950 CFM	—

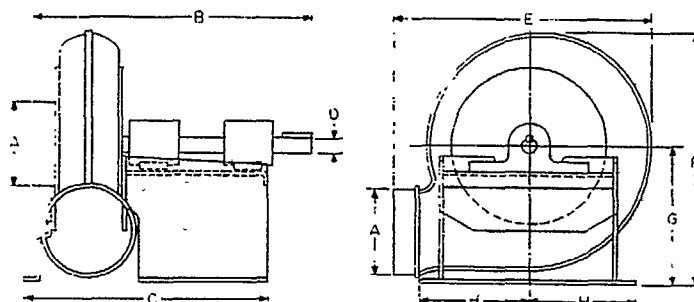
C. Arrangement 4, 1800 rpm Motor

Fan Size	1" SP	2" SP	4" SP	6" SP
S507	790 CFM	500 CFM	—	—
S509	1635 CFM	1400 CFM	660 CFM	—

Sturtevant Division

Dimensions and Weights

Do not use for construction purposes. Request Dimension Sheet 1130 page 1 for arrangement 1 and 1130 page 2 for arrangement 4 exact and complete dimensions.



(Approximate Dimensions Shown)

Fan Size	Wheel Dia	A	B	C	D	E	F	G	H	Weight		
										Arr 1	Arr 4 3600 RPM	Arr 4 1800 RPM
S504	8"	4"	14"	12"	1"	13"	13 1/2"	7"	4 1/2"	40	65	
S505	9"	5"	17"	16"	1"	16 1/2"	16 1/2"	8 1/2"	6 1/2"	80	105	
S506	10"	6"	20"	18"	1"	18 1/2"	18 1/2"	10"	7 1/2"	100	140	
S507	12"	7"	21 1/2"	20"	1 1/2"	21 1/2"	21 1/2"	12"	8 1/4"	150	150	130
S509	16"	9"	23 1/2"	21 1/2"	1 3/4"	25 1/2"	26 1/2"	14"	9 1/4"	220		250
S510	19"	10 1/2"	25 1/2"	24"	1 3/4"	29 1/2"	30 1/2"	17"	9 3/4"	310		

Shipment

• Standard S500 arrangement 1 fans with optional shaft cooling device will be shipped within 5 working days after receipt of a complete order at Hyde Park, Mass.

• Standard S500 arrangement 4 fans with listed motors will be shipped within 10 working days after receipt of a complete order at Hyde Park, Mass.

The Superquick 500 Program

The most popular sizes of Westinghouse Series 500 Cast Iron Industrial Fans are now in stock at Hyde Park, Mass. Selected motors for arrangement 4 fans are also stocked to allow SUPERQUICK shipment on a wide selection of fans and motors.

Description of S500 Fans

Series S500 Superquick Fans feature a cast iron housing with steel sub-base and supports. The radial bladed, side plate wheel in conjunction with the cast iron housing makes the S500 fan excellent for fume or vapor exhaust, handling dust or granular material, or supplying air for combustion or product cooling.

Fan arrangement 1 is designed for use with a floor mounted separate motor. There is no restriction on motor size. Both motor and V drive usually are supplied by the purchaser. Air temperature range is -20°F to 350°F.

Fan arrangement 4 consists of the same cast iron housing and wheel construction used with arrangement 1 except the fan wheel is mounted directly on the motor shaft. Fans are shipped completely assembled with the motor factory mounted. Absolute air temperature limits are -20°F to 150°F maximum. Stock motors are Westinghouse, 3600 rpm or 1800 rpm, ball bearing, enclosed, 3-60-230/460.

Standard Fans

All sizes are available as either clockwise or counterclockwise rotation, top horizontal, up blast, bottom horizontal, or downblast discharge, and are painted with red zinc chromate iron oxide primer.

Fan arrangement 1 available in sizes S504, S505, S506, S507, S509, S510

Fan arrangement 4, 3600 rpm direct connected motor available in sizes S504, S505, S506, S507

Fan arrangement 4, 1800 rpm direct connected motor available in sizes S507 and S509.

Accessories

Extra cost accessories include a spare wheel for either arrangement 1 or 4 and a special shaft cooling device that allows arrangement 1 fans to handle air temperatures up to 450° (Not available for arrangement 4 fans).

Motor Horsepower, Arrangement 4 Fans

Fan Size	3600 RPM Motor	1800 RPM Motor
S504	1	—
S505	2	—
S506	3	—
S507	—	1 1/2
S509	—	1 1/2

Westinghouse

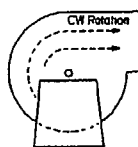


How to Determine Fan Rotation, Discharge, and Arrangement

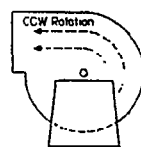
It is very important that correct fan rotation, discharge, and arrangement be specified when ordering. No action can be taken on an order until this information is available.

Always look at the fan drive side (i.e., opposite the air inlet side) when determining fan rotation or motor position for arrangement 9 fans.

Rotation (Specify Either Clockwise or Counterclockwise)

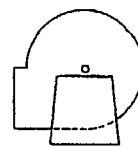


Clockwise (CW)

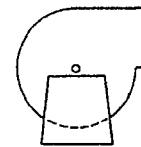


Counterclockwise (CCW)

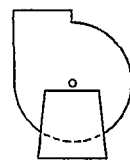
Discharge (Specify Which is Desired)



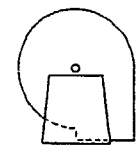
Bottom Horizontal (BH)



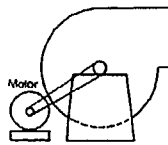
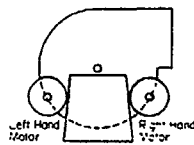
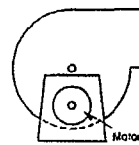
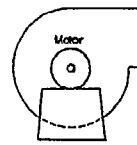
Top Horizontal (TH)



Up Blast (UB)

Down Blast (DB)
Not Available on S400M

Arrangement (Specify Which is Desired)

Arrangement 1
(Motor Mounted Separately)Arrangement 9
Motor Mounted on Outside Sub-base.
Specify LH or RH (S400M Only)Arrangement 10
Motor Mounted on Inside of Sub-base (S400M Only)Arrangement 4
Fan wheel Mounted Directly on Motor Shaft (S500M Only)

Ordering Information Checklist

Fill in the blanks to obtain complete information on the fan you need. Work on an order cannot begin without complete information

	S400M				S500M		
	Arr 1	Motor & Drive Supplied by others		Motor & Drive Supplied by 		Arr 1	Arr 4
		Arr 9	Arr 10	Arr 9	Arr 10		
Basic Fan Information							
Purchase Order Number	—	—	—	—	—	—	—
"Bill To" Address	—	—	—	—	—	—	—
"Ship To" Address	—	—	—	—	—	—	—
Method of Shipment	—	—	—	—	—	—	—
Fan Size	—	—	—	—	—	—	—
Fan Rotation	—	—	—	—	—	—	—
Fan Discharge	—	—	—	—	—	—	—
Fan Arrangement	—	—	—	—	—	—	—
Motor Frame Size	N/A	—	—	N/A	N/A	N/A	N/A
Motor Position	N/A	—	N/A	—	N/A	N/A	N/A
Motor Horsepower	N/A	N/A	N/A	—	N/A	N/A	N/A
Motor Speed (rpm)	N/A	N/A	N/A	N/A	N/A	N/A	—
Motor Type (Open or Enclosed)	N/A	N/A	N/A	—	—	N/A	N/A
CFM (Air Volume) Desired	N/A	N/A	N/A	—	—	N/A	N/A
Static Pressure Desired	N/A	N/A	N/A	—	—	N/A	N/A
Fan rpm (If Available)	N/A	N/A	N/A	—	—	N/A	N/A
Fan BHP (If Available)	N/A	N/A	N/A	—	—	N/A	N/A
Accessories							
Spare Wheel	—	—	—	—	—	—	—
Flanged Inlet	—	—	—	—	—	N/A	N/A
Flanged Outlet	—	—	—	—	—	N/A	N/A
Shaft Cooling Device	—	—	N/A	—	N/A	—	N/A

Note: N/A Not Applicable

Sturtevant Division

**Terms and Conditions of Sale
Payment**

Recent and regular Westinghouse customers may have established credit with the Westinghouse Treasury Dept. Based on approval by the Treasury Dept. Superquick Fans can be shipped on open account. Terms of payment are net 30 days.

New customers may specify one of three options

1. Establish credit through the Westinghouse Treasury Representative in your area. The time required to obtain such approval may delay shipment.
2. Cash-in-advance accompanying your Purchase Order. All checks should be made payable to Westinghouse Electric Corp., Sturtevant Division.
3. COD.

Shipments

All Superquick Fans are sold FOB Cars, Point of Shipment. Open account customers may specify either freight collect or prepaid freight charges added to the invoice. Cash-in-advance customers may obtain prepaid shipment by adding estimated freight charges to the pre-payment. COD customers will receive shipments freight collect.

Warranty

Westinghouse warrants that all SUPER-QUICK Fans and Accessories when delivered (given to the carrier) will be free of defects in workmanship and material. Westinghouse will repair or replace at its option such defective material, FOB factory, within one year from date of delivery.

Complete terms & conditions of sale including warranty will be provided on request.

How to Order Superquick Fans

Sturtevant Division Sales Engineers and Sales Representatives are located in major cities throughout the United States. They will be happy to quote prices, give application advice, enter your order, and expedite credit approval if required.

If a Sturtevant Division Representative is not available, orders may be placed direct with the Sturtevant Division Factory at Hyde Park (Boston), Mass.

Step 1. Gather complete ordering information as determined from the ordering information checklist.

Step 2. Telephone 617-361-3700. Ask for Extension Superquick. Someone will be available to answer questions, quote prices, and enter orders. If all lines are busy, the operator will take your name and number. Your call will be returned promptly.

Sturtevant Division

Superquick 3000

Famous Series 3000 Silentvane® Fans with backwardly inclined blading.

- 10 sizes of S3000 fans with wheel diameters of 13-37 inches.
- all class 2, SWSI, arrangement 10, motor mounts on inside of bearing pedestal.
- air volumes to 25,000 CFM.
- static pressures to 7" water gauge.
- air temperatures to 450°F.
- optional extra cost inlet flange, outlet flange, access door, drain, open and enclosed motor, V-drive and weather-cover.

Superquick 300

Series 300 Axiflo® Fans, arrangement 9, V-drive, vertical or horizontal mounting.

- 9 sizes of S300 tubeaxial fans with wheel diameters of 15-40 inches.
- 5 sizes of S300 vaneaxial fans with wheel diameters 27-40 inches.
- air volumes to 40,000 CFM.
- static pressures to 3" water gauge.
- optional extra cost mounting feet, streamlined inlet, inlet cone, outlet cone, non-spark wheel, open and enclosed motor, V drive and weathercover.

Superquick 1100

Series 1100 Belt Driven Ventilating Sets with backwardly inclined blading.

- 10 sizes of S1100 fans with wheel diameters of 13-37 inches.
- air volumes to 21,500 CFM.
- static pressures to 3" water gauge.
- optional extra cost motor, V-drive, weathercover and vibration isolators.

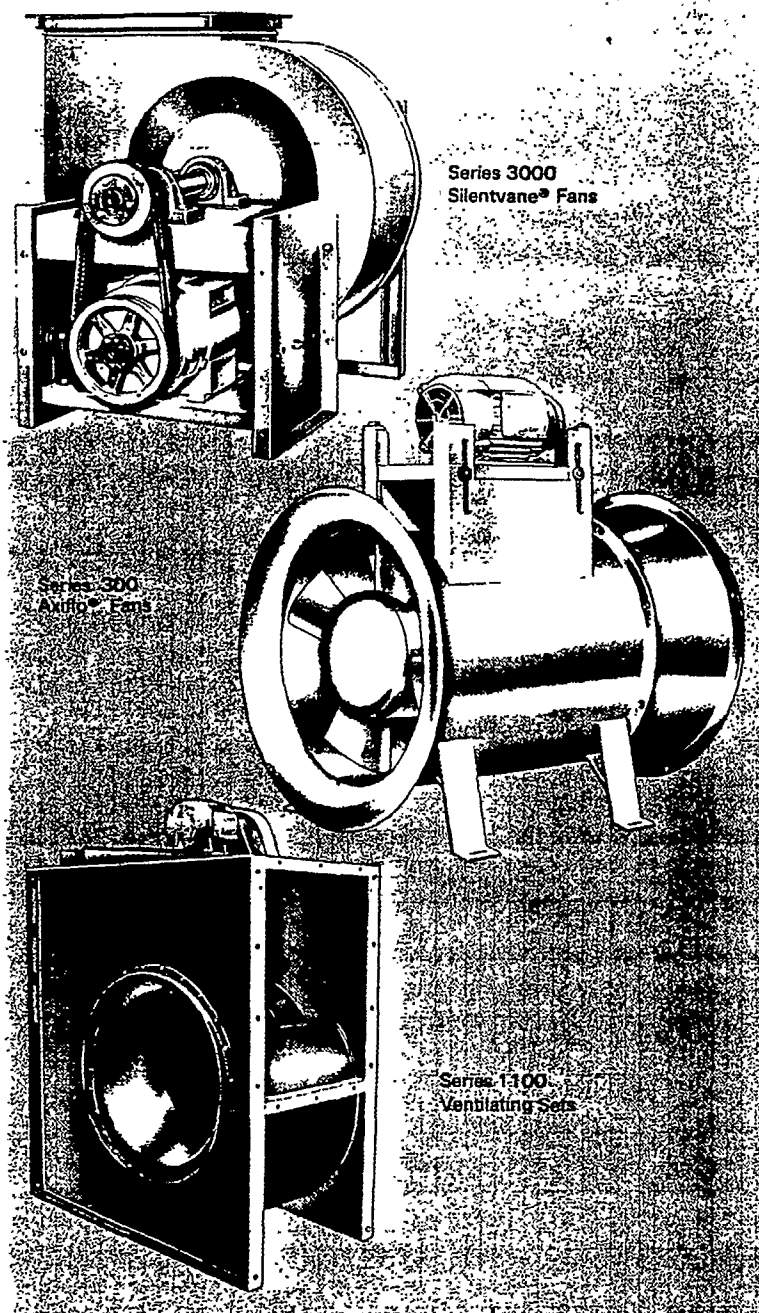
S3000 Fans available April 1973

S300 Fans available May 1973

S1100 Ventilating Sets available June 1973

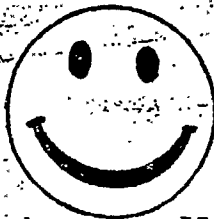
Westinghouse Electric Corporation
Sturtevant Division: Hyde Park,
Boston, Mass. 02136

Other Superquick Fans from Sturtevant Division



Jim Davis

You might need for your records



2-17-81

MEMO

from: FRANK ZELLNER

*Environmental Systems
Div of Petter Products
15534 South Garfield
Paramount, Calif. 90723*

Ph. 213-633-4220

*48- #166 S-134 Poly-Biode
Bags*

for #2-800 Dust Collector

**BIRD
& SON**
QUALITY PRODUCTS SINCE 1948



CENTRIFUGAL FANS GENERAL PURPOSE AND INDUSTRIAL

INSTRUCTION BOOK
90-220/90-340
(FORMERLY I.B. 1100-2)

INSTALLATION • OPERATION • MAINTENANCE

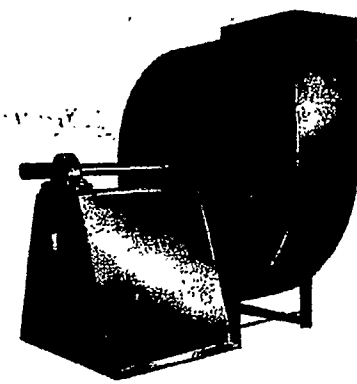
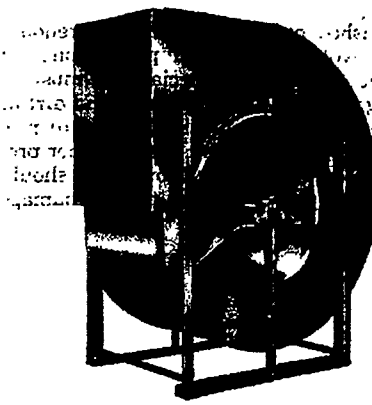


Figure 1 Series 8000 General Purpose Fan, Arrangement 3, Single Width, Single Inlet, Clockwise Rotation, Top Horizontal Fixed Discharge

Figure 2 Series 8000 General Purpose Fan, Arrangement 3, Single Width, Single Inlet, Counterclockwise Rotation, Top Angular Up Fixed Discharge

Figure 3 Series 400 Industrial Fan, Arrangement 1, Counterclockwise Rotation, Upblast Convertible Discharge

Your Centrifugal Fan is a carefully engineered and constructed piece of machinery which will give long, satisfactory service provided correct installation and proper maintenance practices are observed. This bulletin, along with others for belt drives, motors, and/or other accessories which may be furnished as part of your fan, are supplied for your information and guidance. **DO NOT DESTROY AFTER INSTALLATION. RETAIN WITH THE UNIT FOR MAINTENANCE.** Preventive maintenance including periodic inspection, testing, cleaning, lubrication, and replacement of worn parts will forestall equipment breakdowns — minimize equipment shut-downs.

RECEIVING

Fans are prepared for shipment according to the Uniform Freight Classification Rules of the carriers. The equipment is carefully inspected before shipment and it is the responsibility of the carrier that it be in perfect condition upon arrival.

When the carrier accepts a shipment and signs our bill of lading, the carrier is responsible for any subsequent shortages or damage, evident or concealed, and claim must be made against the carrier.

Immediately upon receipt of a shipment, carefully inspect for damage and shortage. If any damage and/or shortage is detected or suspected, the carrier must be asked to conduct inspection. The consignee's representative should not accept shipment without a notation on the delivery receipt indicating items not delivered or apparent extent of damage.

When a shipment is opened and damage found which was not evident externally ("concealed damage"), it is mandatory that the consignee request an immediate inspection by the carrier.

Promptly file a claim against the final carrier (railroad or trucking company). A claim will not be considered by a transportation company unless presented within nine months from date of receipt of equipment.

Supersedes IE 1100-1 Effective April 1964

HANDLING

Small completely assembled units should be handled carefully, to avoid dropping or jarring. The units should be lifted only by the base; not by the shaft, coupling, motor, or housing.

Medium sized fans of non-convertible construction up to 9½ feet high have either four holes in the casing side sheet support angles or separate tabs welded to the casing for lifting and handling.

Large units may be shipped knocked-down (disassembled). Special care is required in handling the individual parts, such as the fan wheels and shafts, to prevent distortion of the components.

Fan wheels and housings which are furnished with special coverings, such as rubber, phenolic enamels, or other protective coatings, should be handled with extreme care as many of these coatings are easily injured, and even a small chipped spot will break the continuity of the coating and destroy its value as a protective covering for the metal.

Fan wheels are carefully balanced to give smooth and vibrationless operation. If the fan wheel is damaged during handling it may result in an out-of-balance condition, and require rebalancing. If a shaft is dropped

EFFECTIVE JULY 1974

or unduly strained, it may be sprung which will also result in out-of-balance operation of the fan.

A fan wheel should never be lifted by or allowed to rest its entire weight on the side plates or blades. The fan wheel and shaft assembly can be lifted by slings around the shaft on each side of the wheel so the wheel is supported by its hub. If a chain is used there must be sufficient padding on the shaft and wheel to prevent the scoring of the shaft or injury to the wheel. The chain or cable should be spread with timbers, or braced by some other method to prevent damage to the wheel side plates. If the fan wheel is received separate from the shaft, a support should be placed through the hub for lifting, making sure not to injure the finished bore of the wheel.

All housings which are shipped knocked-down have been completely assembled during manufacture to make certain of proper fit. The various pieces are match-marked to facilitate field assembly.

STORING

Storage in a finished building or heated warehouse is preferred and involves no special precautions. If out-of-doors storage is necessary, special care must be taken to protect against moisture, corrosion and dirt or dust accumulation. Wheels should be blocked to prevent their being rotated by the wind. As a further precaution equipment stored under such conditions should be inspected periodically to make sure that no damage is developing.

INSTALLATION

FOUNDATIONS

Fans and motors or other drivers should be mounted on substantial foundations. Concrete is normally the best foundation, although substantial wood or steel frame supports may be used.

The possibility of noise and vibration being present and transmitted through the building is reduced with a substantial foundation. The equipment should be levelled on the foundation and securely held in place by suitable anchors or bolts.

Sleeves in concrete foundations are desirable to permit adjustment of hold down bolts. If shims are used, they should straddle the mounting bolts.

When flexible mountings are used it is very important to support the equipment so that its operation is not impaired. This is too frequently ignored and yet without rigid mechanical support the purpose and intent of the isolation is defeated. This is particularly true of belt driven fans, where it is essential that the fan and its motor be mounted on a common rigid base which can then be isolated from the building structure, as a single unit. The wisdom of this very definite requirement is obvious. Since the fan and its motor each operate at its own separate and distinct frequency, they must be bolted to a heavy connecting member to prevent drive distortion and assure smooth operation.

HOUSING ASSEMBLY

Self contained units need only to be securely mounted in a level position on a good substantial foundation, and aligned with V-belts, sheaves, or couplings. However, it is advisable to check the condition of the bearings, fan wheel, vane control mechanism, if any, and coupling.

Larger apparatus may be shipped knocked-down for ease of handling. Housing parts are match-marked to facilitate assembly. Assembly procedure will vary with different sizes of fans, but in general the housing should be assembled first, followed by installation of the wheel with shaft, housing inlet, bearing pedestals, and bearings. In some cases the fan wheel either with or without the shaft installed may be set in the partially assembled housing easier than it can be installed later in the com-

pleted housing. Most housings are designed with the inlet removable to permit installation of the wheel and shaft thru this opening.

CONVERTIBLE

Some fans designated as having "convertible" housings are designed so the direction of discharge can be changed easily in the field.

To change the discharge of convertible fans:

1. Support the housing with a sling or by blocking. Remove the bolts fastening one or both pedestals to the housing.
2. Rotate the housing to the desired position.
3. Replace bolts.

FAN WHEELS

All fan wheels are balanced before shipment. They should fit the shaft snugly. The key should fit both the fan hub and shaft snugly, and the set screws should be well tightened.

Rotation of the fan equipment and its corresponding fan wheel is designated as clockwise or counter-clockwise viewing it from the nominal driving side. If viewed from the opposite side, the designated rotation will be the reverse of the observed rotation. Single inlet fans are always considered as having the backplate side, or side opposite the inlet, the nominal driving side even though they may be arranged to drive from the inlet side.

For correct performance, it is essential that a fan wheel of corresponding rotation be assembled in a given housing, and also that the fan wheel be rotated in proper direction. This can be determined from the fact that correct rotation of a centrifugal fan wheel is always in the direction leading from the "cut-off" (shortest radius of the housing) around the housing scroll towards the outlet. Rotation of a fan wheel where the blades are carried on a spider is easily determined from the fact that the supporting spider or arms are on the back of the blades. The correct rotation being in a direction away from the supporting arms or spider.

11/21/73

BAYLEY, INC.

DIVISION OF LAU INDUSTRIES

6600 West Burnham St., Milwaukee, Wisconsin 53219 / Telephone 414 / 545-1000

QUOTATION BY:

Bayley, Inc. - Div. of Lau Industries
6600 W. Burnham Street
Milwaukee, Wisconsin 53219

DATE: November 16, 1973

PROPOSAL NO. FRZ 151173-1

PAGE 1 of 1

QUOTATION TO:

Bird & Son Inc.
P. O. Box 72
Shreveport, Louisiana 71161

PROJECT: Dust Control Systems

LOCATION: Shreveport, La.

INQUIRY NO. _____

ARCHITECT: _____

ENGINEER: R. W. Hawkins

ATTENTION: Mr. R. W. Hawkins

We are pleased to quote you on the following material:

- (1) EX-226-AH Bayley Industrial Exhauster, Std. Gr. 250, 15,000 TS Const. SWSI, Arr. 9R, Clockwise Rotation, Up Blast Discharge, Fan Complete With Flanged Inlet, Flanged Outlet, OSHA Belt Guard, Constant Speed V-Belt Drive 1.5 Service Factor, And A 10 HP 1800 RPM 3/60/230-460V ODP Motor.

FOR THE SUM OF - \$606.00

F.O.B. MILWAUKEE

IF A 10 HP TEFC Motor Is Desired Add - \$54.00

686.72 4/25/74

PERF: 3300 CFM 10" T.P. 1922 RPM 7.4 BHP @ 70°F

Estimated Shipping Weight - 600 Lb's.

Estimated Freight - \$30.00

Delivery 16 Weeks After Receipt Of Order.

Blower - 526.72

motor - 120.00

drive - 40.00

Sept delivery
16 weeks

cc: Eggelhof - Shreveport
Harry Stephens

222-9251

called 4/25

P.O. Box 7803

ordered 6/14

71107

BY

Frank R. Zelloth

Frank R. Zelloth

TERMS: Net 30 Days

DELIVERY: F.O.B. Milwaukee, Wisconsin
Not Freight Allowed

See reverse side for Terms and Conditions

FORM G-104

BIRD 016914

TERMS AND CONDITIONS

PRICE POLICY:

Quotations are subject to acceptance within thirty (30) days from date issued. Prices are firm provided shipment is made within six (6) months from date of order. Shipments made after six (6) months are subject to adjustment to prices in effect at time of shipment.

ACCEPTANCE:

Acceptance of orders for Bayley, Inc. shall be made solely at its manufacturing facility, and is subject to the approval of the credit department. Bayley, Inc. shall be obligated to furnish only the goods described in Bayley's submittal data (if such data is issued) and as described in our quotation or acknowledgement on the reverse side hereof (or attached).

TERMS OF PAYMENT:

Payment terms for goods shipped hereunder will be Net 30 days unless contrary terms appear on the face hereof or unless expressly agreed to in writing by Bayley, Inc. The company reserves the right to add to any account outstanding for more than 30 days a service charge of 1% of the principal amount due at the end of each month.

TAXES:

Add to the prices quoted any manufacturer's gross receipts, sales, or use tax, either federal, state, county or city, payable on the transaction under any applicable statute.

DELAYS AND CANCELLATIONS:

Bayley, Inc. shall not be liable for any delays caused by riots, strikes, fires, floods, lack of transportation or any other contingency beyond its control. Shipment dates are estimates only and no contract will be made to ship in a specified time unless in writing by an officer of the company. Accepted orders are not subject to cancellation except by express approval of Bayley, Inc. and after reimbursement for any and all expenses.

SHIPMENT:

Shipment shall be F.O.B. shipping point with title passing to the buyer upon delivery to the carrier by the seller. Any claims for damage to shortage in transit must be filed by the buyer against the transportation company.

RETURNED GOODS:

Returned goods will not be accepted unless authorized by Bayley, Inc., and tagged with written authorization. Credit for properly returned items will be reduced by restocking and any necessary reconditioning charges.

WARRANTY:

Bayley, Inc. warrants, for a period of one (1) year from date of shipment, that all products of its manufacture are free from defects in material and workmanship when properly installed, cared for, and operated under normal (not corrosive and/or abrasive) conditions, with competent supervision. The product is warranted to have the capacities and ratings set forth in its catalogs, bulletins or submittals when applied to a system having the characteristics specified on reverse side (or attached). Bayley, Inc. obligations and liabilities under this warranty are limited to furnishing F.O.B. shipping point, freight allowed to buyers city (or port of entry) replacement equipment (or at the option of the company, parts therefor) for all Bayley, Inc. products not conforming to the warranty.

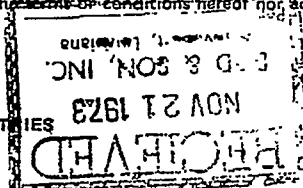
No liability whatsoever shall attach to the seller until full payment has been received. Bayley, Inc. makes no warranty whatever with respect to motors, drives, bearings, switches, controls or accessories, inasmuch as they are warranted by their respective manufacturers. Bayley, Inc. shall not be liable for the labor or other expenses of removal or replacement, not for consequential damages of any kind whatsoever.

The above warranty supersedes, and is in lieu of, all other warranties, including any warranty of merchantability expressed or implied, and no person, agent or dealer is authorized to give any warranties on behalf of Bayley, Inc. nor to assume for Bayley, Inc. any other liability.

IN CONCLUSION:

All orders accepted by Bayley, Inc. are with the express condition that the purchaser agrees with the terms and conditions appearing on the face and reverse side hereof. Bayley, Inc. failure to object to the provisions contained in the buyer's purchase order or other communication shall not be deemed a waiver of the terms or conditions hereof nor acceptance of such provisions.

BAYLEY, INC.
DIVISION OF LAU INDUSTRIES
MILWAUKEE, WISCONSIN
Effective August 1, 1973



A SUBSIDIARY OF PHILIPS INDUSTRIES, INC.

FAN DATA SHEET

PROJECT: _____

A. Characteristics of the Fan at the Specified Performance:

1. Fan manufacturer and designation Bayley Industrial Exhauster
2. BHP is 7.4 at 70°F, _____ at _____ °F.
3. RPM is 1922
4. Outlet velocity is 3600
5. Fan tip speed is 11,393
6. Fan wheel diameter and number of blades 22.625 Dia. 8 Blades
7. Class of fan is 15,000 TS Const.
8. WR^2 value (# Ft²) of wheel is 23.6 Lb's./Ft.²
9. Maximum Allowable Operating RPM is 2534
10. Bearing Description Ball Bearing Pillow Block
11. Fan Bearings - L10 Min. Life Hours Available Upon Order
12. Fan Bearing - Radial Load @ the Operating RPM Available Upon Order
13. In case of axial fan, must Owner supply outlet cone to gain listed performance? Yes _____ No _____

B. Characteristics of the V-Belt Drive: (Fan Arrangement #9 or #10 Only)

1. Manufacturer is Browning
2. Belt size and sheave diameters are Available Upon Order

C. Type of Motor: (Fan Arrangement #9 or #10 Only)

1. Manufacturer is General Electric
2. HP is 10 HP
3. RPM is 1800 SYN.
4. Type is ODP
5. Frame No. is 215T
6. Maximum Frame No. that can fit fan is 215T

D. Time of Delivery After Receipt of Order is 16 - 18 Weeks

E. Fan Weight Complete with Motor and Drive is 600 Approximately

F. Price: Fan unit complete as specified including freight to
Shreveport, Louisiana See Attached Sheet

G. Terms of Payment are Net 30 Days

H. Noise Data - Reported per AMCA Bulletin #300 - Sound Power in
Decibels (Ref. Level 10⁻¹² watts)

AMCA Test Set-Up No. 1

Octave Band No.	1	2	3	4	5	6	7	8
Band Frequency Range	20	75	150	300	600	1200	2400	4800
Cycles per Second	75	150	300	600	1200	2400	4800	9600
Sound Power Rating	114	106	108	105	99	94	88	82

INLET CLEARANCE — Series 3000/8000

Inlet to wheel clearance and alignment are important for satisfactory performance of a fan with backwardly inclined blades.

Handling and shipment may disturb these adjustments.

The points to be checked are shown in Fig. 18 as "A" and "B".

Radial Clearance "A" for both single and double width fans should be uniform all around.

Overlap "B" for double width fans should be the same on both sides. Single width fans should have an Overlap "B" approximately as follows:

Size	Size	Dim. "B"
3012-3033	8012-8033	3 Times "A"
3037-3089	8037-8089	4 Times "A"
3098-3109	8098-8109	5 Times "A"

To adjust "A" on sizes up through 3037/8037, the inlet or inlets may be moved on the side of the housing or if necessary the bearings may be moved on the supports or the shims changed.

To adjust "A" on sizes 3040/8040 and larger, the bearings may be moved on the supports or the shims changed.

To adjust "B" the wheel may be moved on the shaft, the shaft moved in the locating bearing or the bearing moved on the support.

For fans to handle gases at temperatures above 350°F, additional information on clearance and alignment is shown on the general assembly drawing, a copy of which is supplied in the instruction envelope for high temperature fans.

INLET CLEARANCE — Series 400

The performance of Industrial Fans can be affected by wheel and inlet mis-alignment. Handling and shipment may disturb these adjustments. The three types of wheels have radial and axial relationships as indicated.

To adjust "A", "B", or "C", shims under bearings may be changed. To adjust "D" or "E", the wheel may be moved on the shaft, the shaft moved in the locating bearing or the bearing moved on the support. Radial clearance "A", "B" and "C" should be uniform all around for -20°F to +350°F temperature range.

Industrial Fans to operate at temperatures between 350°F and 900°F must be aligned at room temperature with allowances for expansion of fan elements. Note settings for each type wheel in Figure 17.

Radial clearance "F", "G" and "H" for +350°F to +900°F temperature range approach "A", "B" and "C" as fan reaches operating temperature.

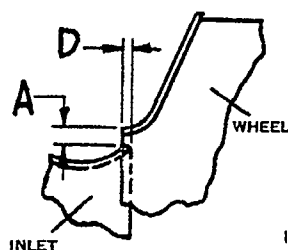


Figure 14
AIR HANDLING WHEEL
(Type A)
8 Backwardly Sloping Blades
with Backplate

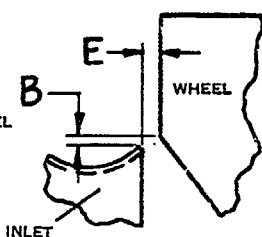


Figure 15
MATERIAL HANDLING WHEEL
(Type MB)
8 Radial Blades with Backplate

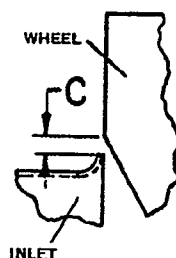


Figure 16
MATERIAL HANDLING WHEEL
(Types M & MR)
6 Radial Blades

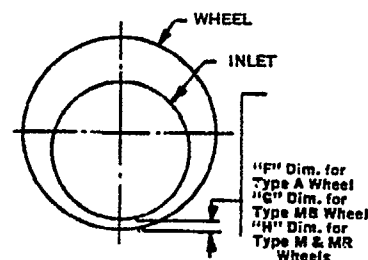


Figure 17
RADIAL COLD SETTING OF
WHEEL AND INLET
(-350°F. to +900°F.)

DIM.	FAN SIZE										
	411	413	415	417	419	421	423	426	429	433	437
A	1/8	3/16	3/16	3/16	3/8	1/4	5/16	5/16	5/16	5/16	3/8
B	1/8	1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	7/16
C	1/32	7/32	5/16	11/32	3/8	7/16	15/32	17/32	19/32	11/16	25/32
D	3/8	3/8	3/8	3/8	7/16	7/16	3/4	5/8	11/16	11/16	7/8
E	1/4	5/16	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16
F	1/32	1/16	1/16	1/16	1/16	1/16	3/32	3/32	3/32	3/32	3/32
G	1/32	1/32	1/32	1/16	1/16	1/16	1/16	3/32	3/32	3/32	1/8
H	1/16	1/16	3/32	3/32	3/32	1/8	1/8	1/8	5/32	5/32	5/32

* All clearances should be set at room temperature

INLET VANE CONTROL (Accessory)

Inlet air spin vane control design 8-A and 8-B for either manual or automatic (by others) operation affords an efficient means of volume control. It is supplied as an accessory only when specifically ordered.

Design 8-A and 8-B controls are essentially the same in construction. Their only difference lies in the fact that Design 8-B carries a bearing at its center for the support of the fan shaft. Design 8-A has no center bearing. **CAUTION**—Design 8-B control should not be used when temperatures exceed 150F.

Ten semi-pie-shaped steel vanes are supported by and rotate on rods bolted to the inlet and screwed into a central inner hub. Each vane is actuated by a ball pin mounted on an operating ring through a U-shaped lever on each vane. The operating ring moves through a 44 degree arc around the vane hub from wide open to closed position.

A $\frac{1}{8}$ " hydraulic grease connection is provided to lubricate the inner channeled surface of the operating ring for both Design 8-A and Design 8-B. Lubrication

once a year is sufficient. A small amount of grease should be spread in the U channels at the same time.

The operation of the vane control should be checked before the fan is started to make sure that all links are free, that the operation is smooth, and that there is no distortion of the casing to cause any binding. Each vane rod should be checked to make sure that it has not loosened in transit. If it has, it can be readily tightened by adjustment of the nuts which hold it in place on the inlet. Also, make sure that the bolts holding the inlet to the fan casing are tight. This is particularly important with Design 8-B vane controls where the fan shaft is actually supported through these bolts.

Linkage on motor operated vane controls should be connected so that the vanes will move from tightly closed to fully open with the fan in operation.

Periodic inspection and lubrication of the bearing in the center of the design 8-B Vane Control is necessary. See "Lubrication" under the section on Operation and Maintenance.

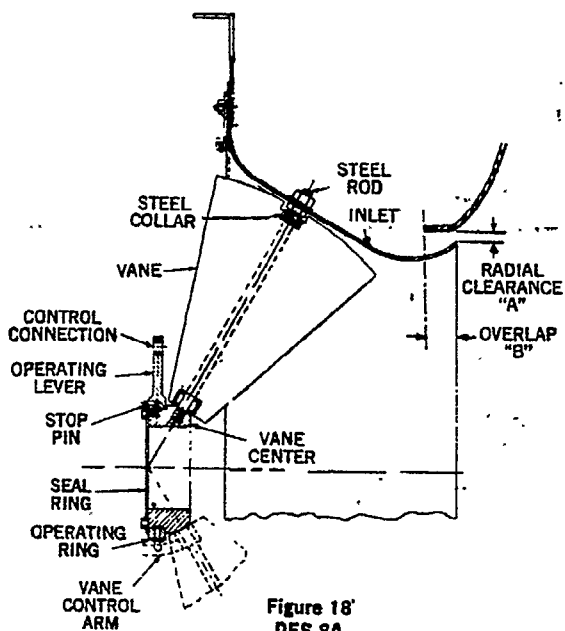
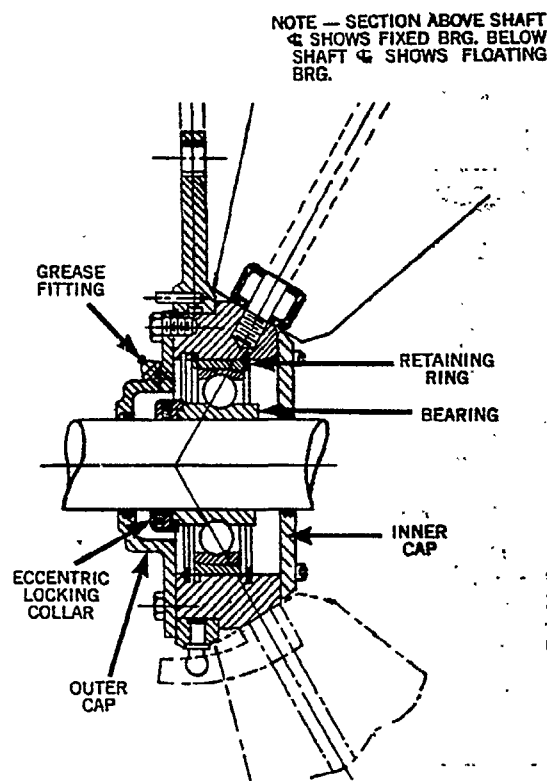


Figure 18
DES 8A

Design 6 Vane Control is similar to Design 8-A and is used with overhung wheel fans in Sizes 12 thru 27, Classes I and II, in Series 3000 and 8000 only.

Radial vanes mounted on rods are rotated by vane levers actuated by a control ring in a manner similar to Design 8-A operation. However, Design 6 vane levers are "U" shaped and fit over pins mounted on the control ring.



NOTE — SECTION ABOVE SHAFT
SHOWS FIXED BRG. BELOW
SHAFT SHOWS FLOATING
BRG.

CAUTION - Design 8B control
Figure 19 should not be used when temp -
DES 8B erture exceeds 150F.

VANE CONTROL AND CLEARANCE



FAN PRE-OPERATING CHECK

General
Instructions

Before putting the fan into operation, remove the shipping wire holding the wheel, and turn the wheel by hand to be sure it is not rubbing against the inlet or casing. Check for tightness of wheel on shaft.

Factory-mounted motors on fans may shift during shipment requiring check of V-belt alignment and tension. Re-position the motor for proper alignment and belt tension, if necessary. For Axiflo(R), and Centriline(R) fans with belt tubes, make sure belts are not rubbing against the internal belt guard. On these fans, belt stretch may be taken care of by re-positioning the motor base using the next higher base holes. For Centrifugal fans, re-position the motor on its base.

Check wheel rotation when starting the unit to be sure it conforms to the direction of the rotation arrow on the casing. For Axiflo, Axiflex and Centriline fans, make sure the airflow direction is the same as indicated by the airflow arrow.

Check bearing hold-down bolts and the locking collars or other devices for tightness. Be sure to check the bearing for lubrication. See the included instruction book for details.

The operation of the vane control should be checked before the fan is started to make sure that all links are free, that the operation is smooth, and that there is no distortion of the casing to cause any binding.

NEW INFORMATION

EFFECTIVE: January 25, 1972

WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV., HYDE PARK, BOSTON, MASS. 02136

DRIVES

Sheaves should be firmly locked in position and the key should fit tightly. Alignment is correct when the fan and motor shafts are parallel and belts are perpendicular to the shaft. A straight edge or taut cord may be used to line up the sheaves. Belts should be under light tension and should feel "live" when thumped. Belts should deflect slightly under light pressure. Excessive tension should never be applied since it will damage the cords and shorten the life of the belts. Never pry the belts over the rim of the sheave, but slack off on the take-up bolts until the belts can be slipped over the rim of the sheaves. Prying the belts over the rim of the sheave may break the cords and shorten the life of the belts.

COUPLINGS

Couplings on units shipped assembled are carefully aligned at the time of assembly. To prevent possible strains and damage in shipment, the coupling bolts, pins, or flexible member are disconnected, or may be removed and shipped separately.

When assembling, carefully check the alignment of the coupling and make corrections if necessary. Sometimes, handling during transportation will have thrown the coupling out of line.

Accurate alignment can usually be obtained by holding a straight edge across the adjoining flanges (or by means of a dial indicator) at four equal positions around the circumference and adjusting the coupling halves until they are parallel and concentric. The clearance between the faces of the couplings can be equalized at four equidistant points by checking with a tapered thickness gauge. For best results angular alignment should be within one degree on most commercial type couplings. Shafts should be centered within .003".

Flexible couplings should be adjusted so that end thrust caused by the fan is not transmitted to motor bearings. Also, where the drive is by steam turbine or large motor, final alignment of the coupling should be made when the driving motor or turbine is hot, to take apparatus expansion into account.

PRE-OPERATING CHECK

Before putting the fan into operation, remove any shipping wire or blocking holding the wheel and turn it by hand to be sure it is free and not rubbing against the casing or inlet. Check for tightness of the wheel on the shaft. Be sure bearings are lubricated and in alignment. Check tightness of bearing collars as they may loosen during shipment. Check coupling, belts, or applicable drive for alignment. Apply power momentarily to assure correct rotation.

OPERATION AND MAINTENANCE

The successful operation of a fan depends to a large extent on the reliable operation of the bearings and the balance of the fan wheel.

LUBRICATION

Care should be taken to see that the bearings have been properly inspected and lubricated. When first starting the fan see that it turns over easily, and check the bearings after a short interval of operation, to be certain that they are not overheated.

If the bearings are grease lubricated ball bearings, they will probably not need to be relubricated. Bearings are provided with seals to retain the lubricant and prevent entry of dirt. Under normal temperature (-20 to 150°F) conditions, when fans are handling clean air, the bearings are considered to be lubricated-for-life and regreasing is unnecessary. When fans are handling contaminated air or are operating at elevated temperatures, periodic lubrication is required.

While one of the major advantages of anti-friction bearings lies in the fact that they require infrequent lubrication, and thus makes the maintenance problem relatively simple, they still require attention.

All ball bearings which are shipped assembled on the fan shaft are packed completely full of grease. This helps prevent moisture and dirt from getting into the bearings before they are put into service. If the fans are not put into service prior to one year after shipment, the grease should be changed as grease has a tendency to deteriorate and become hard, losing its lubricating qualities. Ball bearings designed for oil lubrication are also packed with grease to protect the

bearing during shipment. This grease should be removed and the bearings thoroughly cleaned and filled with oil before operating. Ball bearings which are shipped separately (not mounted on the shaft) are shipped as received from the bearing manufacturer. These bearings only receive a light protective coating of grease and it is therefore necessary that the customer grease or oil these bearings, as the case may be, before operating the unit. Where pillow blocks are provided with drains good practice in lubrication is to remove the drain plug, and pump in new grease until it appears at the drain plug. Then run the bearing about five minutes with the drain open and the excess grease will be forced out.

For normal temperatures, a high quality, light, neutral mineral grease of about #1½ to #2 consistency should be used. The grease should be free of abrasive fillers and highly resistant to oxidation.

When ball bearings are used in Vane Control Center, use #2 neutral mineral grease if inspection indicates grease is needed. Follow bearing lubrication instructions when roller bearings are used.

Oil lubricated sleeve or anti-friction bearings should be filled directly into the bearing chamber through the top of the bearing until it reaches the overflow point at the lower oil cup, or until the sight glass indicates the proper level. This will prevent under oiling as a result of plugged lower oil cup line or sight glass pipe.

Oil lubricated bearings operating at normal room temperature should be lubricated with SAE Specification 20 oil. For hot locations use SAE No. 30 Specification.

VIBRATION CAUSES

All wheels are statically and dynamically balanced at the factory and alignment is checked. If vibration is noticed, check the following:

1. Bearing and drive alignment
2. Shaft straightness
3. Wheel or sheaves loose on shaft
4. Loose or worn bearings
5. Loose mounting bolts
6. Motor out of balance
7. Sheaves out of balance
8. Worn or corroded wheel
9. Accumulation of material on wheel

If vibration is not due to any of the causes listed, check the fan wheel for worn blades and for material accumulation. Material accumulation should be scraped off, or in the case of accumulated paint spray, the wheel may be removed and placed in an alkali bath. Do not use an alkali bath on wheels of aluminum, since aluminum is quickly attacked by alkali.

MAINTENANCE

Fan wheels having badly worn blades should be replaced or rebuilt. Where wear is severe in spots, the worn places may be built up by applying hard metal surfacing by welding.

Rebuilt or repaired (including hard metal surfacing) fan wheels require careful balancing before being returned to service. An experienced man can give the

wheel a running balance operating on its own shaft and bearings.

Standard fans handling corrosive fumes should have the internal parts wire brushed, scraped clean and then painted with an acid-resisting paint. This process should be repeated when the paint film begins to show signs of deterioration.

When a V-belt must be replaced, replace the entire set of belts as new belts will not work properly in conjunction with used belts, due to the difference in length.

In general it can be said that good fan maintenance consists of systematic and regular inspection, testing, care and adjustment, together with the repair or replacement of worn parts before failure occurs. Experience will best determine the frequency of the various maintenance operations, since the requirements will vary widely, depending upon the severity of the application and local conditions. However, once a schedule of maintenance operations has been set up, it should be carefully adhered to for best results.

RENEWAL PARTS

When continuous fan operation is vital, it is recommended that spare parts such as bearings, V-belts and, in some cases, wheels be kept on hand for emergencies.

Renewal parts should be ordered from the local Westinghouse, Sturtevant Division office. Give the nameplate data; especially fan type, size and style or serial numbers. Describe the part accurately and if the equipment appears to be special, or if there is any doubt as to the description, include a dimensional sketch of the part required.

WESTINGHOUSE ELECTRIC CORPORATION
STURTEVANT DIVISION - BOSTON, MASS. 02136

Printed in U.S.A.



**Series 200, 300, 3-U200, 3-Y200,
U200, Y200 and W200**

BALL BEARING UNITS Service Instructions B-BBU-22

IMPORTANT—Read Carefully

These instructions are provided to aid in the proper installation, operation and maintenance of Link-Belt Series 200, 300, 3-U200, 3-Y200, U200, Y200 and W200 ball bearing units. They should be carefully read and followed. Failure to do so may result in unsatisfactory service as well as serious personal injury or property damage.

CAUTION

The reliability built in all Link-Belt bearings can be realized in service only when they are correctly selected, properly installed, protected and maintained.

The correct selection of bearings or mounted units requires that the magnitude and nature of all loads, speeds, alignment, mounting, operating requirements and maintenance be adequately considered. The selection of materials for and design of housings, shafting, fasteners, seals and accessories as well as provisions for installation and maintenance must follow good engineering principles.

Housings must be selected and installed with regard to the degree and direction of the forces that will occur. Housings should not be used under tension loads except with adequate safety factors. For this reason pillow blocks are best suited to withstand radial loads passing through the base. When heavy loads or shock loads are possible, it is most important to mount a unit so that the line of force passes directly into its base, or so that the unit is directly and substantially supported other than through its mounting bolts. Where the line of force falls outside the base, such as with horizontal or uplift loads on pillow blocks, serious housing and fastener deflection or failure may occur. These conditions may require designs using different materials, fasteners, mounting design, stop bars, etc., together with proper safety factors. When these conditions are unavoidable, the FMC Corporation, Bearing Division, should be consulted.

The following general points of installation and operation are very important:

- Cleanliness**—Keep dirt, water and metal chips off all parts.
- Careful Handling**—Hammer blows or improper use of force can damage precision parts.
- Shaft Fits**—Bearings should have proper fits on the shafts to minimize fret wear. See installation instructions for shaft tolerances.
- Bolts**—Housing mounting bolt tightness is important to prevent the housing from shifting, and to adequately support loads.
- Setscrews**—Setscrews must be properly torqued to prevent the shaft from slipping in the inner ring and to prevent loosening during operation.
- Free Rotation and Alignment**—Check for free rotation before machine start-up to assure

that final alignment is proper. Although bearings are alignable in housings, they will not "self-align" in many cases and destructive moment loads may be imposed if initial installation alignment is not provided.

- Lubrication**—Units designed for relubrication must be adequately lubricated. A bearing not properly lubricated can run to destruction and possibly cause damage to other components. Add grease slowly. Rapid application may blow the seals and allow the grease to escape.

INSTALLATION

- Check Shaft**—Shafting must be clean, round, straight, free of burrs and nicks and of correct size. For the average installation with moderate loads and speeds, the shaft should measure as follows.

Shaft Diameter	Recommended Tolerance
1/2" thru 2"	Nominal to minus .0005"
2 1/4" thru 3 1/4"	Nominal to minus .0010"

Where dynamic balance is important or where loads and/or speeds are high, a light press fit may be required. Consult FMC Corporation, Bearing Division for recommendations.

- Shaft Preparation**—When frequent removal of bearings is anticipated, file flats on the shaft approximately 1/4" deep under the collar setscrew locations. This provides for easy removal, as bearings will clear the burrs caused by correctly tightened setscrews.
- Lubricate Shaft & Bearing Bore**—Coat the shaft and bearing bore with grease or oil to facilitate assembly.
- Assemble on Shaft**—If it is necessary to tap or press units on the shaft, use a hardwood

block, soft steel bar or tube against the end of the inner ring. DO NOT strike or exert pressure on housing or seals.

Spring Locking Collar Units—Back out all collar setscrews to clear the shaft and slide the units into position on the shaft.

Eccentric Cam Locking Collar Units—Slide each unit into position on the shaft with the cam locking collar positioned for engagement with the inner ring cam. Collars must be tightened in the direction of shaft rotation.

- Bolt Fixed or Locating Unit to Support**—Bolt fixed unit securely to its support. Bolt grade selection is important on many applications depending on load and shock conditions. SAE Grade 5 mounting bolts properly torqued can be used. Grades over SAE 5 should not be used with cast iron housings.
- Final Positioning**—Establish final shaft position and secure locking collar of fixed unit to shaft. A spanner wrench or drift hole is provided in the O.D. of eccentric cam locking collars to aid in proper tightening. Tighten collar setscrew(s) to the torque values given in Table 1.
- Bolt Expansion or Other Unit to Support**—If an expansion unit is used, position the cartridge in the housing to allow for adequate movement in the direction of expected expansion. Align and shim the housing as necessary to place the bearings in the approximate center of their housing alignment range. Bolt unit securely to its support. (Reference step 5)
- Final Mounting**—Rotate shaft slowly, under load if possible, for several revolutions to properly center the ball elements with respect

TABLE 1—Collar Setscrew Tightening Torque

Shaft Size (In.)	Seating Torque (In.-Lbs.) (1)			
	W200	Y200	U200	U300
1/2 to 1 1/4	92	92	23	40
3/4	92	92	40	40
1 1/4 to 1	92	92	40	92
1 1/4 to 1 1/4	185	185	92	185
1 1/4 to 1 1/4	325	325	185	185
1 1/2 to 1 1/4	325	325	185	185
1 1/2 to 1 1/4	325	325	185	325
1 1/2 to 1 1/4	325	325	185	325
2 to 2 1/4		460	325	460
2 1/4 to 2 1/4		460	325	460
2 1/2 to 2 1/4			460	680
2 3/4 to 2 1/4			680	680
3 to 3 1/2			680	1350
3 1/4 to 3 1/4			1350	1350
3 1/2 to 4			1350	2350

(1) Values may vary $\pm 5\%$

Note: Satisfactory tightness may be obtained by using a standard hex wrench (50-52 Minimum RHN C) and tightening until a slight permanent twist is obtained in wrench for each setscrew.

to the raceways. Tighten collar setscrew(s) of remaining bearing, following the same procedure as outlined in Step 7.

9. **Check System for Freedom of Rotation**—Any condition of strain, irregular rotational torque, abnormal sound or vibration may be due to improper alignment, improper location, bent shaft, distorted supports, etc. Installation should be rechecked and corrections made as required.

The use of stop bars welded to the support at each end of units leaving about $\frac{1}{2}$ " space for ease of assembly is good practice. Wedge shims in $\frac{1}{2}$ " space after units are securely fastened. These bars assure proper location of the units and prevent shifting when loads are applied.

LUBRICATION

Units are prelubricated. With relubricatable designs no additional lubricant is required for start-up. As a precaution, if equipment is to be built and left idle for any period of time prior to actual use relubricatable bearings should be filled 100% full to provide maximum protection from corrosion, etc. The suggested relubrication schedule under Table 2 is a general guide.

The specific conditions on an application such as exact hours of operation, temperature, moisture, speed and dirt govern the required lubrication cycle. This can be determined by inspection of the flushed out lubricant during a trial period of operation. Add grease slowly. Use a sufficient volume of grease to purge the bearing seals of old lubricant. It is preferable to rotate bearings during relubrication where good safety practice permits.

Inspection of bearing installations at least every six months is recommended. Any unusual noise or vibration change should be immediately investigated.

WARRANTY AND LIABILITY

All FMC Corporation equipment is of high quality and is manufactured in conformity with the best commercial practices in the various lines. We guarantee all equipment manufactured by us to be free from defects in material and manufacture at time of shipment for a period of one (1) year from the date of shipment. We will furnish without charge, but will not install, replacement for such parts as we find have been defective, provided that the defect is reported to us within one (1) year from the date of shipment and provided that such part is returned, upon request, transportation prepaid, to the FMC Corporation factory from which the part was shipped. Improper lubrication, deterioration by chemical action, and wear caused by the presence of abrasive materials, do not constitute defects.

This guarantee shall not apply to any equipment which has been subjected to misuse, misapplication, neglect (including but not limited to

TABLE 2—Grease Lubrication

OPERATING ENVIRONMENT		Bearing Operating Temperature	Greasing Interval (1)	Use Grease Equivalent to these (2)
Dirt Exposure	Moisture Exposure			
Slight	None	32°F to 120°F 120°F to 160°F 160°F to 200°F	6 months 2-4 months 1-2 months	High quality NLGI No. 2 multi-purpose ball bearing greases are generally satisfactory. Consultation with a reputable lubricant supplier is recommended.
Moderate to Heavy		32°F to 160°F 160°F to 200°F	1-4 weeks 1 week	
Slight to Heavy	Direct water splash or exposure to outdoor environment	32°F to 200°F	Daily to 1 week or as determined by inspection of installation	Mobil Oil Co., Mobilux EP2 Shell Oil Co., Alvania EP2 Texaco Inc., RB 2
Slight	None	-60°F to 32°F	Determined by inspection of installation	Esso, Beacon 325 Shell Oil Co., Aeroshell 7A Texaco Inc., Low Temp EP
		above 200°F		Special lubrication may be required.

(1) Frequency of regreasing will vary, depending on the hours of operation, temperature and surrounding conditions.

(2) FMC Corporation, Bearing Division can provide assistance in selection of lubricants given knowledge of operating conditions.

proper maintenance), accident, improper installation, modification, or adjustment made without FMC Corporation's written consent. Equipment manufactured by others is not warranted in any way by us but carries only the manufacturer's warranty, if any.

All warranty claims must be submitted within ten (10) days of discovery of defects or shall be deemed waived. No representative of our company has any authority to waive, alter, vary or add to the terms hereof without prior approval in writing. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, (INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF FMC CORPORATION.

It is expressly understood that our liability for our products is limited to the furnishing of such replacement parts, and we will not be liable for any other expense, injury, loss or damage whether direct or consequential, including but

not limited to loss of use, income, profit or production, or increased cost of operation, or spoilage of or damage to material, or otherwise, arising in connection with the sale, installation, use or inability to use, or the repair or replacement of, our products.

FMC Corporation, Bearing Division
7601 Rockville Rd., Box 85
Indianapolis, Indiana 46206
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Stock Carrying Distributors and Representatives
Throughout the World



**Series 200, 300, 3-U200, 3-Y200,
U200, Y200 and W200**

BALL BEARING UNITS Service Instructions B-BBU-22

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CAUTION

The reliability built in all Link-Belt bearings can be realized in service only when they are correctly selected, properly installed, protected and maintained.

The correct selection of bearings or mounted units requires that the magnitude and nature of all loads, speeds, alignment, mounting, operating requirements and maintenance be adequately considered. The selection of materials for and design of housings, shafting, fasteners, seals and accessories as well as provisions for installation and maintenance must follow good engineering principles.

Housings must be selected and installed with regard to the degree and direction of the forces that will occur. Housings should not be used under tension loads except with adequate safety factors. For this reason pillow blocks are best suited to withstand radial loads passing through the base. When heavy loads or shock loads are possible, it is most important to mount a unit so that the line of force passes directly into its base, or so that the unit is directly and substantially supported other than through its mounting bolts. Where the line of force falls outside the base, such as with horizontal or uplift loads on pillow blocks, serious housing and fastener deflection or failure may occur. These conditions may require designs using different materials, fasteners, mounting design, stop bars, etc., together with proper safety factors. When these conditions are unavoidable, the FMC Corporation, Bearing Division, should be consulted.

The following general points of installation and operation are very important:

- A. **Cleanliness**—Keep dirt, water and metal chips off all parts.
- B. **Careful Handling**—Hammer blows or improper use of force can damage precision parts.
- C. **Shaft Fits**—Bearings should have proper fits on the shafts to minimize fret wear. See installation instructions for shaft tolerances.
- D. **Bolts**—Housing mounting bolt tightness is important to prevent the housing from shifting, and to adequately support loads.
- E. **Setscrews**—Setscrews must be properly torqued to prevent the shaft from slipping in the inner ring and to prevent loosening during operation.
- F. **Free Rotation and Alignment**—Check for free rotation before machine start-up to assure

that final alignment is proper. Although bearings are alignable in housings, they will not "self-align" in many cases and destructive moment loads may be imposed if initial installation alignment is not provided.

- G. **Lubrication**—Units designed for relubrication must be adequately lubricated. A bearing not properly lubricated can run to destruction and possibly cause damage to other components. Add grease slowly. Rapid application may blow the seals and allow the grease to escape.

INSTALLATION

1. **Check Shaft**—Shafting must be clean, round, straight, free of burrs and nicks and of correct size. For the average installation with moderate loads and speeds, the shaft should measure as follows.

Shaft Diameter	Recommended Tolerance
1/2" thru 2"	Nominal to minus .0005"
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Where dynamic balance is important or where loads and/or speeds are high, a light press fit may be required. Consult FMC Corporation, Bearing Division for recommendations.

2. **Shaft Preparation**—When frequent removal of bearings is anticipated, file flats on the shaft approximately 1/4" deep under the collar setscrew locations. This provides for easy removal, as bearings will clear the burrs caused by correctly tightened setscrews.
3. **Lubricate Shaft & Bearing Bore**—Coat the shaft and bearing bore with grease or oil to facilitate assembly.
4. **Assemble on Shaft**—If it is necessary to tap or press units on the shaft, use a hardwood

block, soft steel bar or tube against the end of the inner ring. DO NOT strike or exert pressure on housing or seals.

Spring Locking Collar Units—Back out all collar setscrews to clear the shaft and slide the units into position on the shaft.

Eccentric Cam Locking Collar Units—Slide each unit into position on the shaft with the cam locking collar positioned for engagement with the inner ring cam. Collars must be tightened in the direction of shaft rotation.

5. **Bolt Fixed or Locating Unit to Support**—Bolt fixed unit securely to its support. Bolt grade selection is important on many applications depending on load and shock conditions. SAE Grade 5 mounting bolts properly torqued can be used. Grades over SAE 5 should not be used with cast iron housings.
6. **Final Positioning**—Establish final shaft position and secure locking collar of fixed unit to shaft. A spanner wrench or drift hole is provided in the O.D. of eccentric cam locking collars to aid in proper tightening. Tighten collar setscrew(s) to the torque values given in Table 1.
7. **Bolt Expansion or Other Unit to Support**—If an expansion unit is used, position the cartridge in the housing to allow for adequate movement in the direction of expected expansion. Align and shim the housing as necessary to place the bearings in the approximate center of their housing alignment range. Bolt unit securely to its support. (Reference step 6)
8. **Final Mounting**—Rotate shaft slowly, under load if possible, for several revolutions to properly center the ball elements with respect

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1 1/2 to 1 1/4	325	325	185	185
1 3/4 to 1 3/4	325	325	185	325
1 1/4 to 1 1/4	325	325	185	325
2 to 2 1/4		460	325	460
2 1/4 to 2 1/4		460	325	460
2 1/2 to 2 1/4			460	680
2 3/4 to 2 1/4			680	680
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(1) Values may vary $\pm 5\%$

Note: Satisfactory tightness may be obtained by using a standard hex wrench (50-52 Minimum RHN C) and tightening until a slight permanent twist is obtained in wrench for each setscrew.

to the raceways. Tighten collar setscrew(s) of remaining bearing, following the same procedure as outlined in Step 7.

9. **Check System for Freedom of Rotation**—Any condition of strain, irregular rotational torque, abnormal sound or vibration may be due to improper alignment, improper location, bent shaft, distorted supports, etc. Installation should be rechecked and corrections made as required.

The use of stop bars welded to the support at each end of units leaving about $\frac{1}{8}$ " space for ease of assembly is good practice. Wedge shims in $\frac{1}{8}$ " space after units are securely fastened. These bars assure proper location of the units and prevent shifting when loads are applied.

LUBRICATION

Units are prelubricated. With relubricatable designs no additional lubricant is required for startup. As a precaution, if equipment is to be jolted and left idle for any period of time prior to actual use relubricatable bearings should be filled 100% full to provide maximum protection from corrosion, etc. The suggested relubrication schedule under Table 2 is a general guide.

The specific conditions on an application such as exact hours of operation, temperature, moisture, speed and dirt govern the required lubrication cycle. This can be determined by inspection of the flushed out lubricant during a trial period of operation. Add grease slowly. Use a sufficient volume of grease to purge the bearing seals of old lubricant. It is preferable to rotate bearings during relubrication where good safety practice permits.

Inspection of bearing installations at least every six months is recommended. Any unusual noise or vibration change should be immediately investigated.

WARRANTY AND LIABILITY

All FMC Corporation equipment is of high quality and is manufactured in conformity with the best commercial practices in the various lines. We guarantee all equipment manufactured by us to be free from defects in material and manufacture at time of shipment for a period of one (1) year from the date of shipment. We will furnish without charge, but will not install, replacement for such parts as we find have been defective, provided that the defect is reported to us within one (1) year from the date of shipment and provided that such part is returned, upon request, transportation prepaid, to the FMC Corporation factory from which the part was shipped. Improper lubrication, deterioration by chemical action, and wear caused by the presence of abrasive materials, do not constitute defects.

This guarantee shall not apply to any equipment which has been subjected to misuse, misapplication, neglect (including but not limited to

TABLE 2—Grease Lubrication

OPERATING ENVIRONMENT		Bearing Operating Temperature	Greasing Interval (1)	Use Grease Equivalent to these (2)
Dirt Exposure	Moisture Exposure			
Slight	None	32°F to 120°F 120°F to 160°F 160°F to 200°F	6 months 2-4 months 1-2 months	High quality NLGI No. 2 multi-purpose ball bearing greases are generally satisfactory. Consultation with a reputable lubricant supplier is recommended.
Moderate to Heavy		32°F to 160°F 160°F to 200°F	1-4 weeks 1 week	
Slight to Heavy	Direct water splash or exposure to outdoor environment	32°F to 200°F	Daily to 1 week or as determined by inspection of installation	Mobil Oil Co., Mobilux EP2 Shell Oil Co., Alvania EP2 Texaco Inc., RB 2
Slight	None	-60°F to 32°F	Determined by inspection of installation	Esso, Beacon 325 Shell Oil Co., Aeroshell 7A Texaco Inc., Low Temp EP
		above 200°F		Special lubrication may be required.

(1) Frequency of regreasing will vary, depending on the hours of operation, temperature and surrounding conditions.

(2) FMC Corporation, Bearing Division can provide assistance in selection of lubricants given knowledge of operating conditions.

proper maintenance), accident, improper installation, modification, or adjustment made without FMC Corporation's written consent. Equipment manufactured by others is not warranted in any way by us but carries only the manufacturer's warranty, if any.

All warranty claims must be submitted within ten (10) days of discovery of defects or shall be deemed waived. No representative of our company has any authority to waive, alter, vary or add to the terms hereof without prior approval in writing. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, (INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF FMC CORPORATION.

It is expressly understood that our liability for our products is limited to the furnishing of such replacement parts, and we will not be liable for any other expense, injury, loss or damage whether direct or consequential, including but

not limited to loss of use, income, profit or production, or increased cost of operation, or spoilage of or damage to material, or otherwise, arising in connection with the sale, installation, use or inability to use, or the repair or replacement of, our products.

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Indianapolis, Indiana 46206
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FACTORY SUPERVISION

For large heavy duty equipment and fans shipped knocked-down, it is recommended that the installation be supervised by an experienced fan erection mechanic.

A factory erection supervisor may be obtained by contacting the local Westinghouse-Sturtevant Division Office. Detailed instructions for the erection and operation of Heavy Duty Fan equipment is given in Instruction Book 1300-1.

FAN WHEEL TYPES

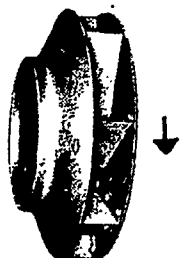


Figure 4
Air Handling Wheel

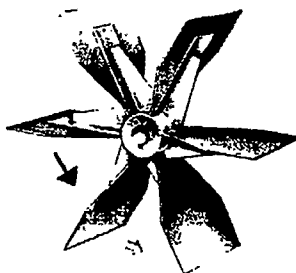


Figure 5
Standard Material
Handling Wheel — Open Type M

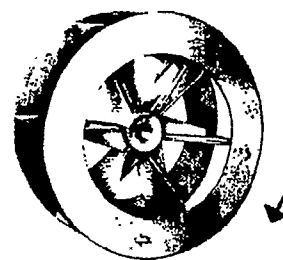


Figure 6
Standard Material
Handling Wheel — Open Rim Type MR

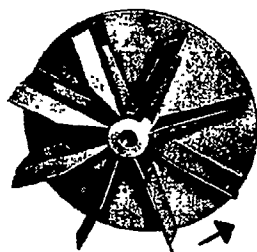


Figure 7
Backplate Material
Handling Wheel — Type MB



Figure 8
Series 3000
Backwardly Inclined Flat Bladed
Wheel, Single Width, Clockwise
Rotation

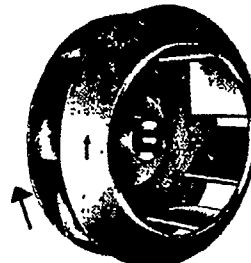


Figure 9
Series 8000
Backwardly Inclined Airfoil Bladed
Wheel, Single Width, Counter-
clockwise Rotation

BEARINGS

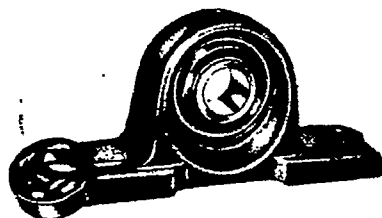


Figure 10
LSA - LSAO - RSAO
Pillow Block Ball Bearing
Grease Lubricated

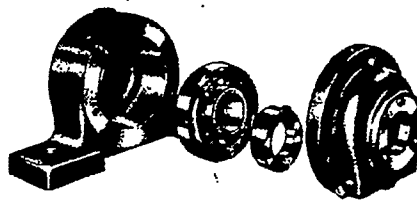


Figure 11
SAL - SAOL
Pillow Block Ball Bearing
Grease or Oil Lubricated

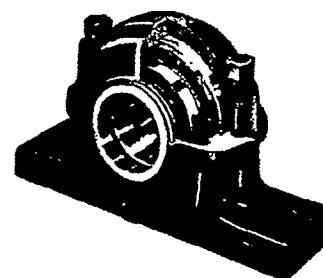


Figure 12
SAF - 225
Pillow Block Roller Bearing
Grease or Oil Lubricated

Bearings for Centrifugal Fans are carefully selected for load, speed, arrangement and other engineering considerations for which your fan will be used. One of the following may be supplied: Pillow Block Ball Bearing, Figure 10 or 11, Pillow Block Roller Bearing, Figure 12 or Ring Oiled Sleeve Bearing, Figure 13.

In general, all ball and roller bearings are grease lubricated at the factory before shipment. In some in-

stances of high temperature operation or heavy duty, oil lubrication may be used, in which case bearings will be supplied with oil cups. One bearing, usually on the drive side, is a fixed type with the bearing race held axially in the pillow block to limit end play. The other bearing is a floating type which allows for expansion.

Separate bearing manufacturer's instructions for

mounting, lubrication and maintenance are supplied in the instruction envelope for the ball or roller bearing used.

If the bearings are received separate from the fan or if they are removed from the fan for any reason, be sure to keep them clean and free from dirt or other contaminants.

ALIGNMENT

Bearing alignment is critical even on many ball and roller bearings designated as "self-aligning". On all bearings, both ball, roller, and sleeve types, if the dust and dirt seals are built into the bearing housing and not part of the race or journal assembly, alignment should center the shaft within one-half the normal radial clearance at the edge of the housing, to prevent excessive dust seal wear and possible shaft scoring. On sleeve type bearings, the housing should be aligned to center the shaft in housing openings. Bolt the housing down tightly; then the locking screw on top of the housing should be loosened and the shaft rotated to permit shifting of the inner assembly on its spherical seat. The adjusting screw should be retightened to exert a light pressure only and locked.

IMPORTANT

It is extremely important not to tighten this adjusting screw hard enough to distort the sleeve and bind the shaft.

LOCKING DEVICES (Bearing Collars)

Most ball and roller bearings have locking devices to insure against the shaft turning inside the inner bearing race and to limit end play. Eccentric type collars

should be turned in the direction of shaft rotation until tight prior to tightening the set screws. Locking devices should be tightened only after the bearings have been properly aligned. The locking collars may be on the inside or outside of the bearings, depending on the design of the equipment. In all cases the collars must be both inside or both outside, to prevent movement of the shaft. Any replacements should be on the same side as with the original equipment.

Replacement thrust collars on sleeve bearings should be set and shrunk in place after the bearings have been aligned and the wheel properly located in the housing. Thrust collar clearance is approximately 0.008" on one bearing only, to limit end play. All other bearings should have a clearance of $\frac{1}{16}$ " at this point to allow for expansion. It is customary to have the close clearance on the bearing nearest the drive, although this is not essential.

On ring oiled bearings it is important that the rings are free to rotate and not jammed. If the bearing is not disassembled when installed but slid over the shaft, the ring should be lifted over the end of the shaft as it goes through the bearing to prevent its jamming.

See that the fan turns over freely by hand before turning on the power. If bearings are improperly assembled or out of alignment and this check is not made, serious damage to the bearings may occur.

Bearings must be properly lubricated. See page 7 for recommended lubricants. Grease type ball bearings are lubricated at the factory but should be checked prior to start-up. All oil type bearings, both sleeve and ball, must be oiled prior to start-up. Extended oil piping should be level and clear of obstructions, so it accurately indicates the oil level in the bearing.

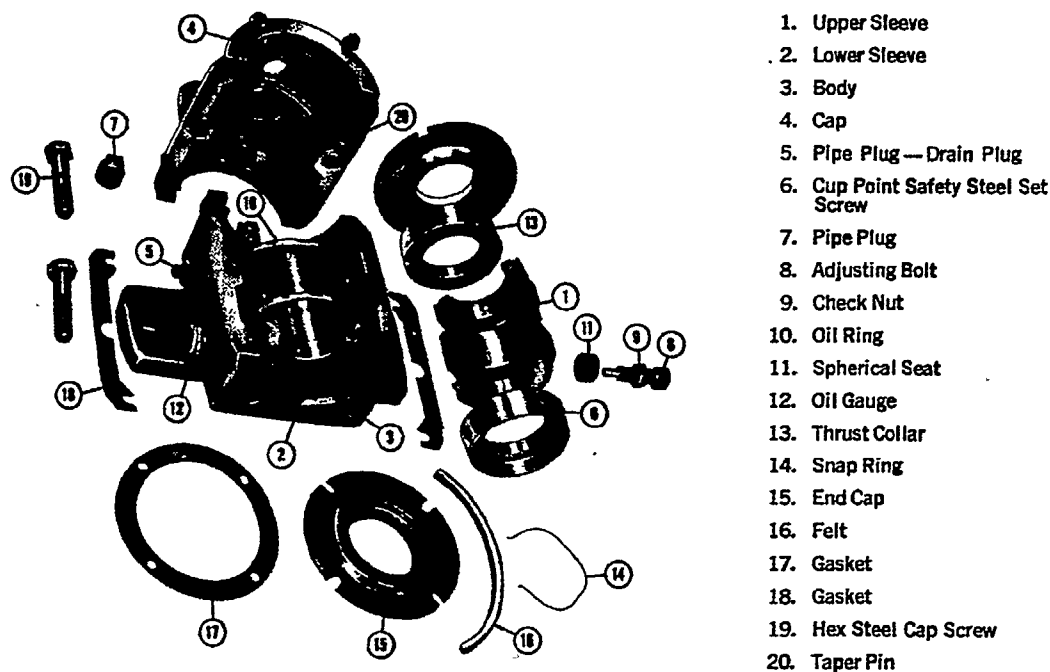


Figure 13 — Self-Aligning Ring Oiling Sleeve Bearing. (S.A.R.O.)

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 PHONE: (414) 545-1000

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APPROVING AUTHORITY	NAME LOCATION	JOB DESCRIP	NAME LOCATION
TYPE SPECIFICATION		TYPE BLDG.	
☐ FLAT OR BASE BID API, INC. ☐ APPROVAL ONLY			

ITEM	QUAN.	MODEL NUMBER & COMPLETE DESCRIPTION	QUAN. BK. O
A.	1	EX-226-AH, STD Gr. 250, 15000 T.S. Const. arr. 9R, C.W.-ROT., UB-7is., Inlet and Outlet Flange, OSHA Belt guard, Constant Speed V-Belt Drive 1.5 S.F., 10 HP 1800 RPM 3/60/230-460V 215 T FR TEFC Motor Perf: 3300 CFM, 10" T.P., 7.4 BHP @ 1922 RPM	

SUBMITTAL DATA FOR RECORD

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Division of Lau Industries
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 PHONE: (414) 545-1000

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LAU INDUSTRIES

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SKETCH NO. AD-2313

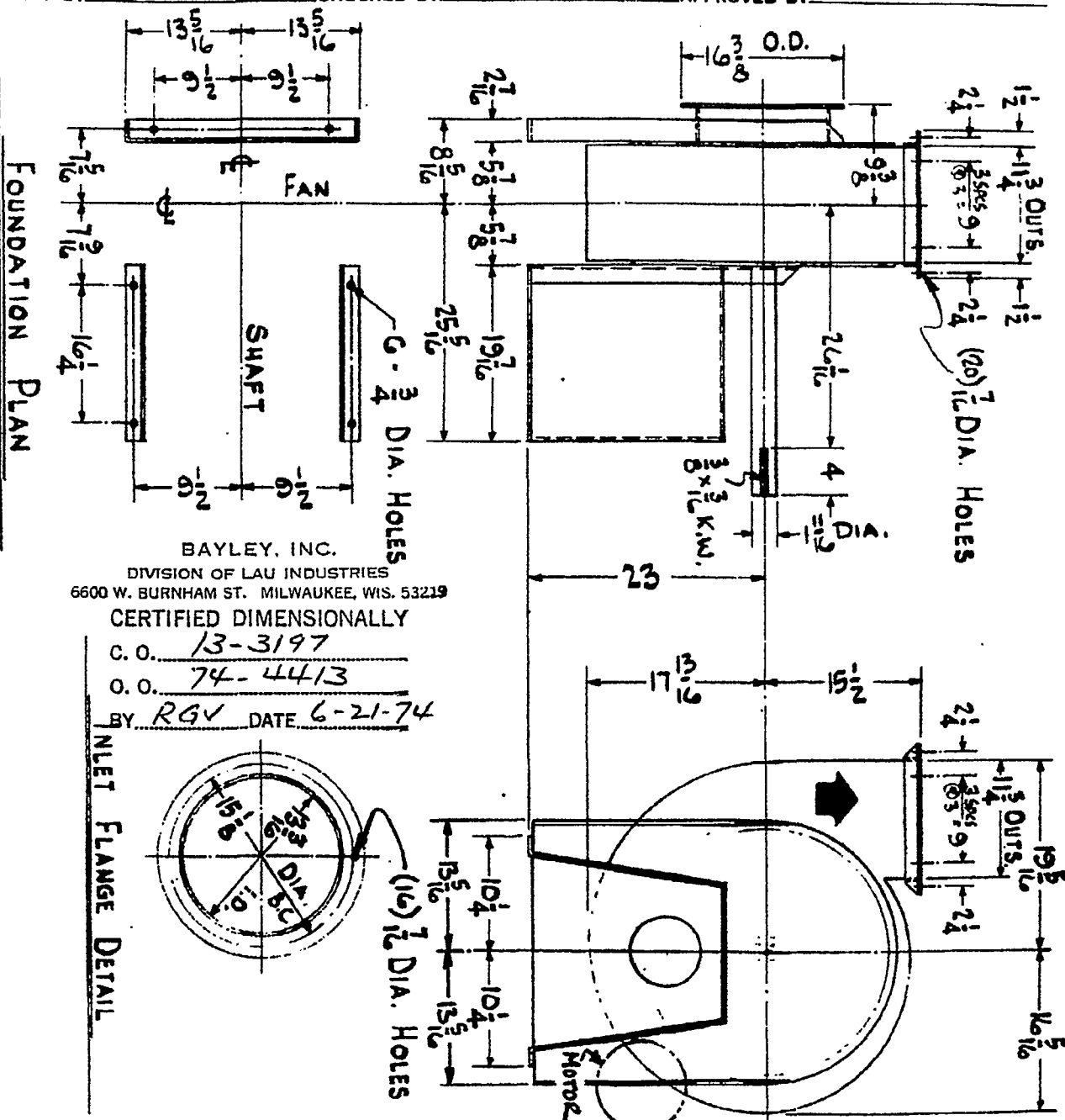
~~SECRET~~ 74-4413

SUBJECT: EX 226 15,000 T.S. SWSI ARR. 9R GROUP 250

MADE BY D.E.

__CHECKED BY.

-APPROVED BY



INLET FLANGE DETAIL

DWG. SHOWS C.W. ROTATION, U.B. DISCHARGE.

FAN WILL BE FURNISHED C.W. ROTATION, UB DISCHARGE

MAX. RPM - 2534 MAX. BHP - 21 MAX. TEMP 250°F

©

6/21/74	DWG No	AD-2313	REV. 00
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LAU INDUSTRIES

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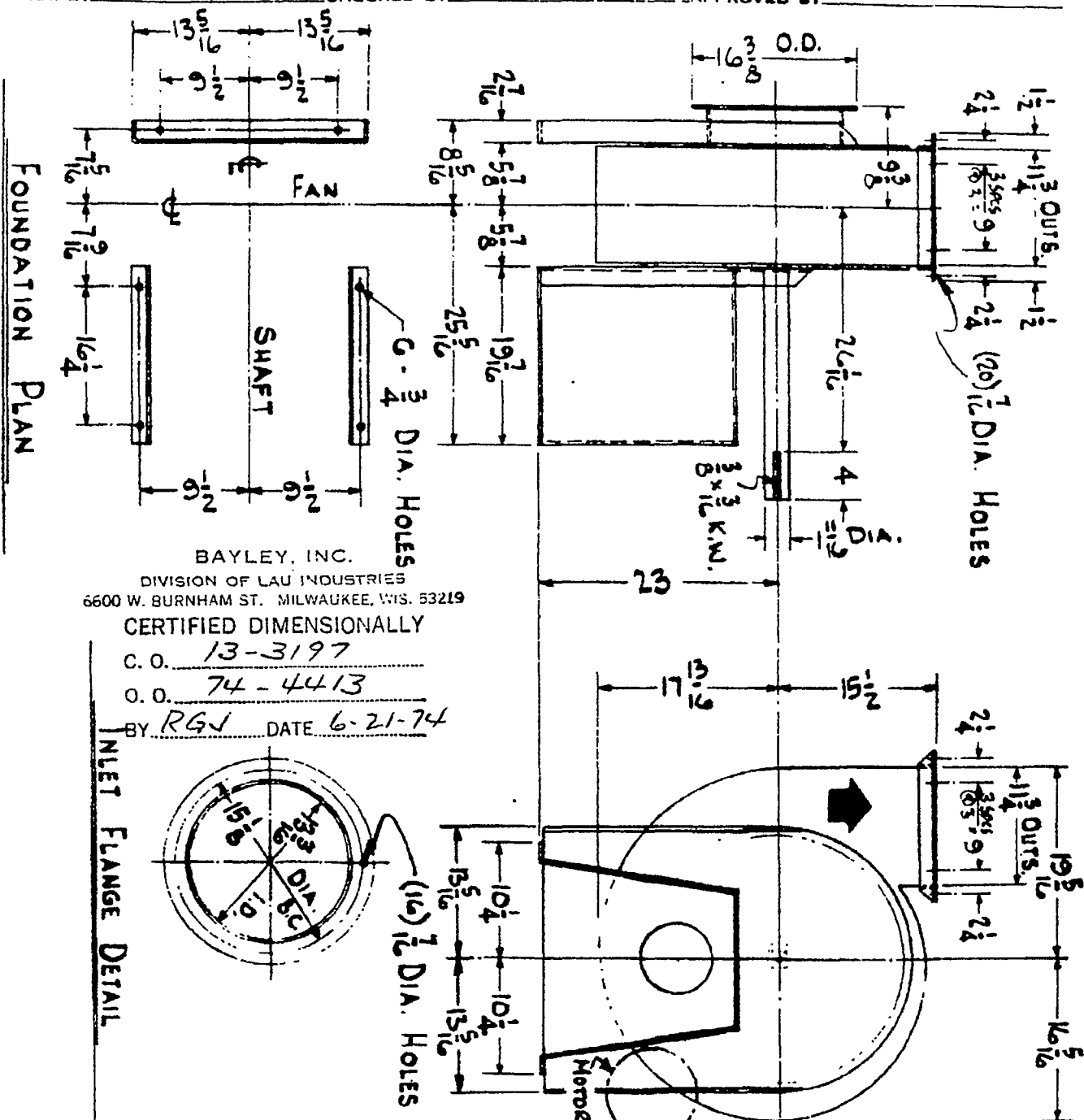
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SUBJECT EX 226 15,000 T.S. SWSI ARR. 9R GROUP 250

MADE BY D.E.

CHECKED BY

APPROVED BY



BAYLEY, INC.

DIVISION OF LAU INDUSTRIES

6600 W. BURNHAM ST. MILWAUKEE, WIS. 53219

CERTIFIED DIMENSIONALLY

C. O. 13-3197

O. O. 74-4413

BY RGJ DATE 6-21-74

INLET FLANGE DETAIL

DWG. SHOWS C.W. ROTATION, U.B. DISCHARGE
 FAN WILL BE FURNISHED C.W. ROTATION, U.B. DISCHARGE
 MAX. RPM - 2534 MAX. BHP - 21 MAX. TEMP 250°F

(C)

6/21/74 DWG No A0-2313 Rev. 00

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 MILWAUKEE, WISC. 53219
 PHONE: (414) 545-1000

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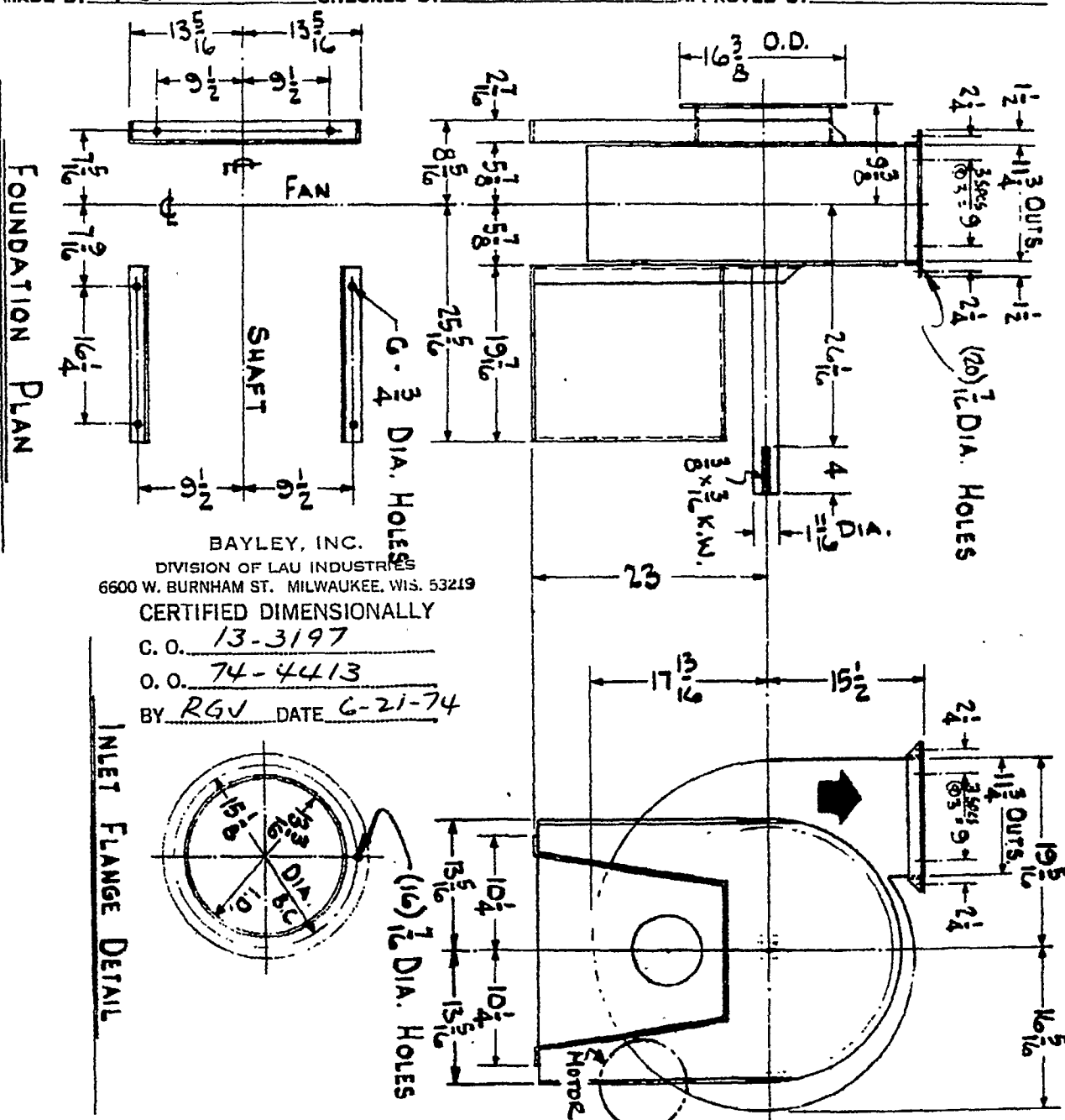
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SUBJECT EX 226 15,000 T.B. SWS1 ARR. 9R GROUP 25a

MADE BY D.E.

CHECKED BY:

APPROVED BY



BAYLEY, INC.

DIVISION OF LAU INDUSTRIES

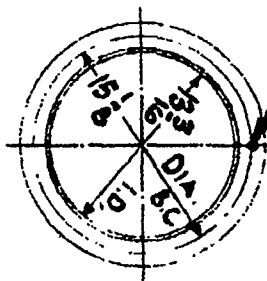
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C. O. 13-3197

O. O. 74-4413

BY RGV DATE 6-21-74



-(16) $\frac{1}{2}$ DIA. HOLES

DWG. SHOWS C.W. ROTATION, U.B. DISCHARGE.

FAN WILL BE FURNISHED C.W. ROTATION, UB DISCHARGE

MAX. RPM- 2534 MAX. BHP- 21 MAX. TEMP 250°F

6/21/74	DW4 No	AO-2313	REV. 00
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SHREVEPORT

State
LA

ZIP Required
71107

Your Phone Number (Very Important)
918-7677-2705

To (Recipient's Name) Please Print
Brian Cleary

Company
Livingston, S. & Son Inc.

Exact Street Address
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City
Mount Airy NC

State
NC

ZIP Required
27007

Recipient's Phone Number (Very Important)
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3 SERVICES (Check only one box)

Priority Overnight (Delivery by 8:00 AM next business day)
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Manufacturer	Cloth Area								
ICA	1600	Installation - #5, 03B							
R.F. Cox	1665								
Mikro Pul	2880								
Sly	1584	5							
Top									
Wheelabrator	1488								
Fuller	1334								
Johnson-March	1680								
Carborundum	1770								

"EVASEE" FOR CENTRIFUGAL
FANS WHERE FAN DISCHARGES
DIRECTLY INTO THE ATMOS-
PHERE- INSIDE THE BUILDINGS.

OUTSIDE OF FAN
DISCHARGE

FOR FANS WITHOUT
FLANGED OPENINGS.

CHECK WITH FAN
FOR SIZE, NO. AND
LOCATION OF BOLTS.

1 X $\frac{1}{8}$ " FLAT BAR - 4 SIDES

EDGE OF
FAN DISCHARGE

FABRICATE ACCORDING TO
SPECIFICATIONS.

NOTE: -

DIMENSIONS OMITTED -
DETERMINED BY MAKE
AND SIZE OF FAN.

ANGLE FLANGE ON
FAN DISCHARGE

18 GA. GALV. SH'T. STL.
ALL PANELS MUST BE
CROSS BROKEN

ELEVATION

2 X GREATER DIMENSION
OF FAN OPENINGS-MIN.

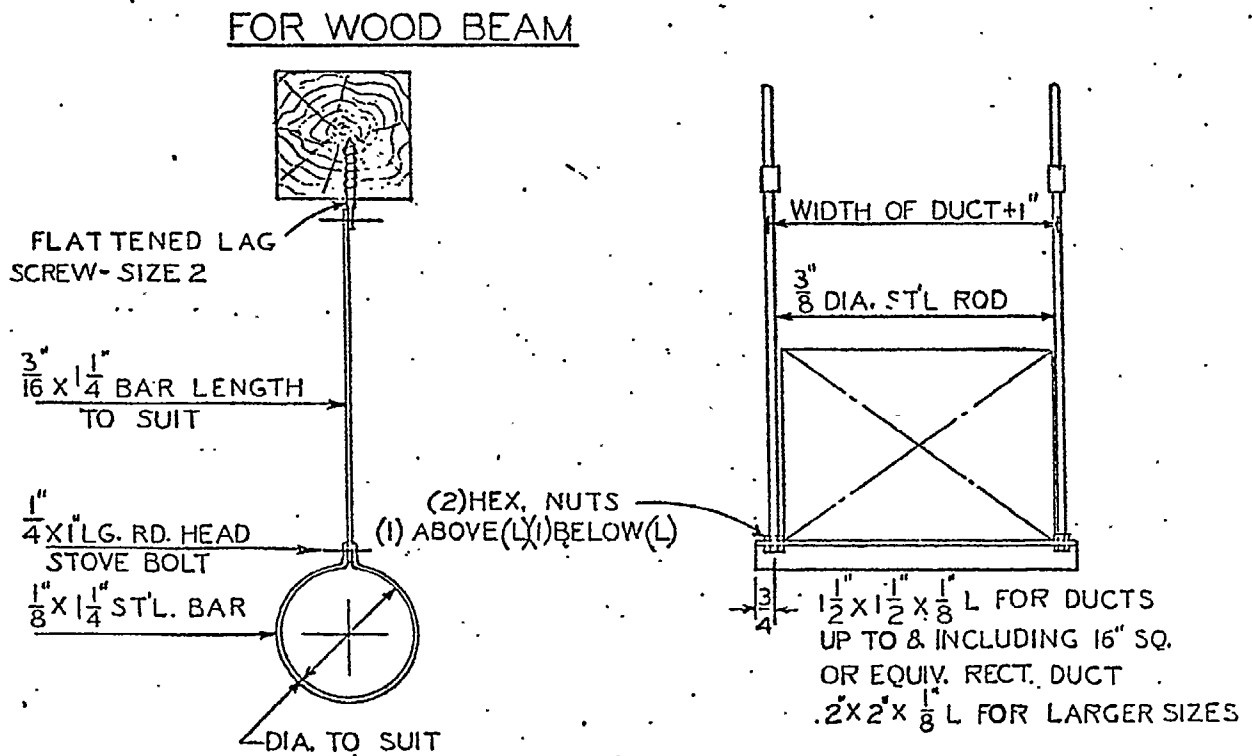
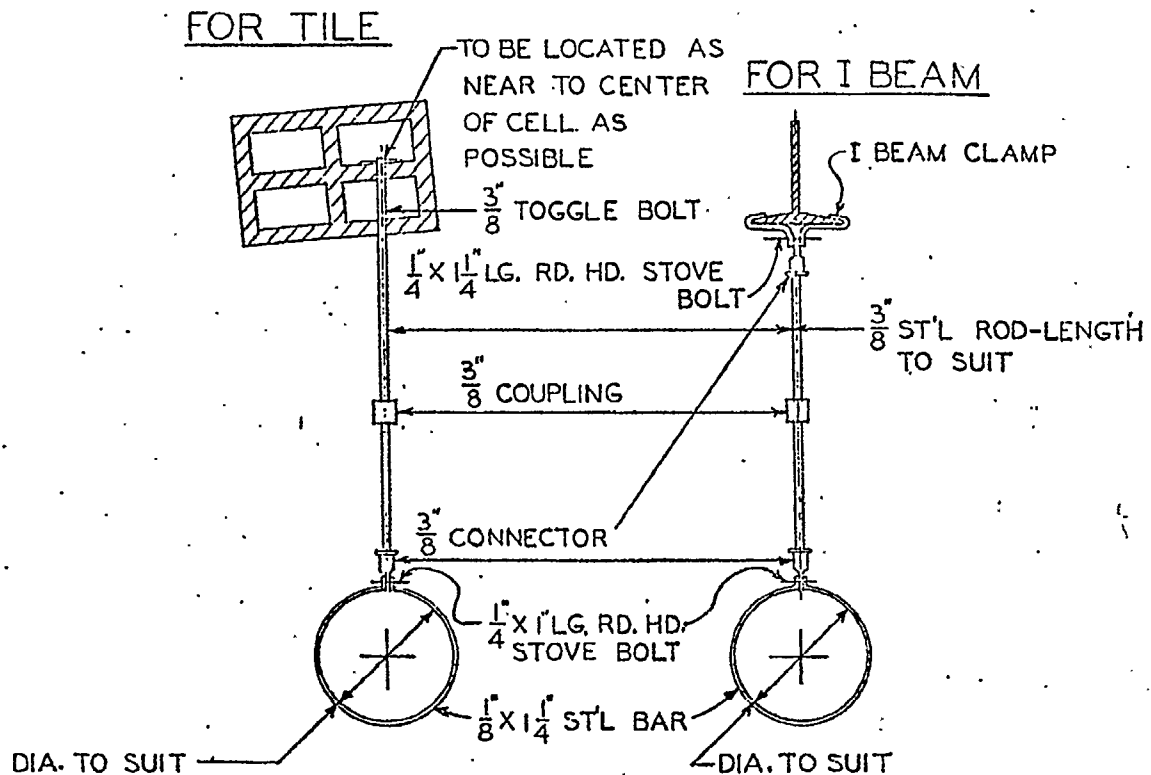
ANGLE FLANGE TO
MATCH FAN

COVER WITH #16 GA. X $\frac{1}{2}$ " WIRE SCREEN
STIFFEN WITH $\frac{3}{16}$ " X 2" F.B. WITH 2"
VERTICAL. SPAN MUST NOT BE GREATER
THAN 2'-0". TACK WELD SCREEN TO STIFF.

FAN DISCHARGE

FAN DISCHARGE

FAN
ROTATION



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GEN. PLANT ENG. DEPT.
MANVILLE, N.J.

45° BRANCH ENTRY

D-218.1

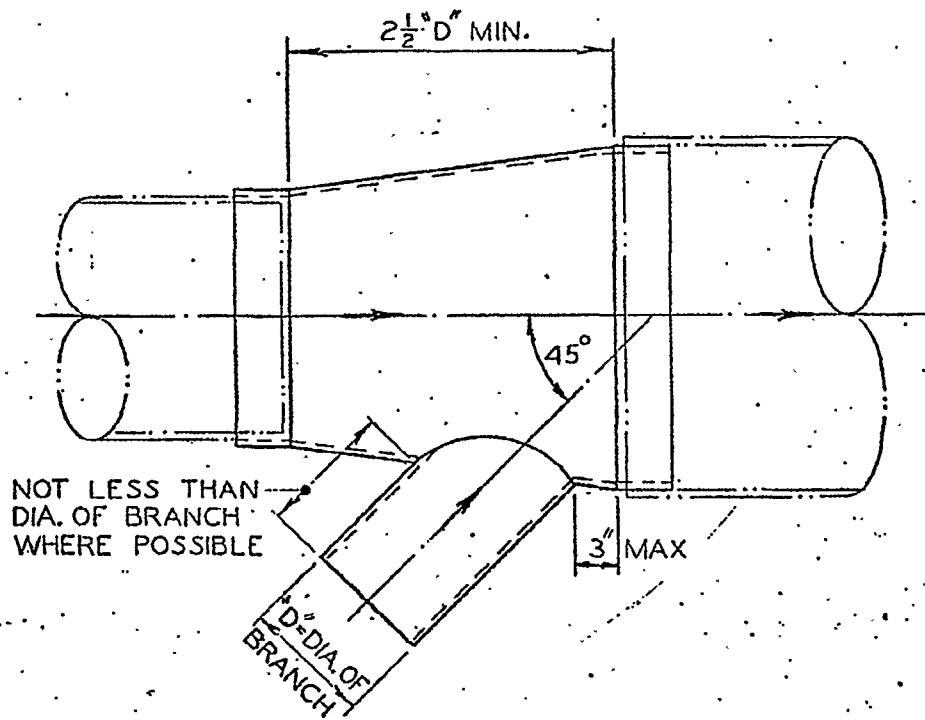
DATE 2-21-61 P'G 1 OF 1

U-STANDARD

ROUND DUCT

APP'D

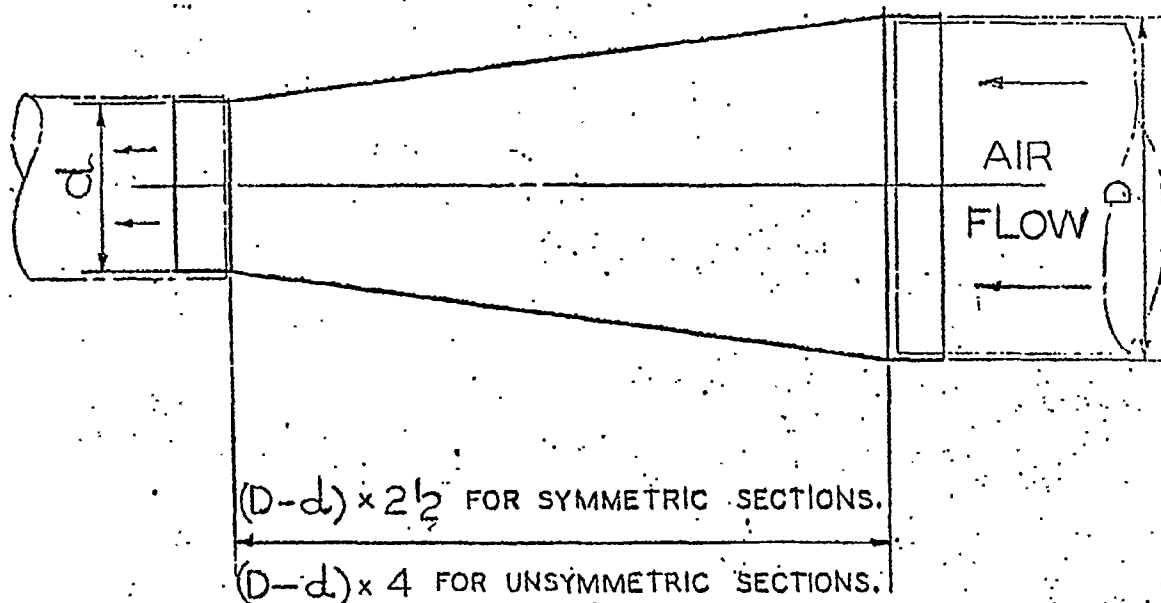
6



NOTE :

- 1) FOR TYPE OF JOINT, SEE SHEET METAL CONSTRUCTION STANDARDS.
- 2) SHEET METAL TWO GAGES HEAVIER THAN LARGER CONNECTING STRAIGHT SECTION SHALL BE USED.

THIS APPLIES TO INCREASING OR REDUCING, RECTANGULAR TO ROUND, RECTANGULAR TO RECTANGULAR, AND ROUND TO ROUND SECTIONS.



"D" AND "d" ARE ON SAME SIDE OR IN SAME VIEW. ALWAYS USE THE LARGEST DIFFERENCE TO CALCULATE $(D-d)$.

- NOTE:
1. THE LAP OF THE GIRTH JOINT IS DEPENDENT UPON DIRECTION OF AIR FLOW.
 2. FOR TYPE OF JOINT, SEE SHEET METAL CONSTRUCTION STANDARDS.
 3. SHEET METAL TWO GAGES HEAVIER THAN LARGER CONNECTING STRAIGHT SECTION SHALL BE USED.
 4. LENGTH OF TRANSITION SHALL BE NOT LESS THAN 12" NOR MORE THAN 36".

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GEN. PLANT ENG. DEPT.
MANVILLE, N.J.

CLEANOUTS

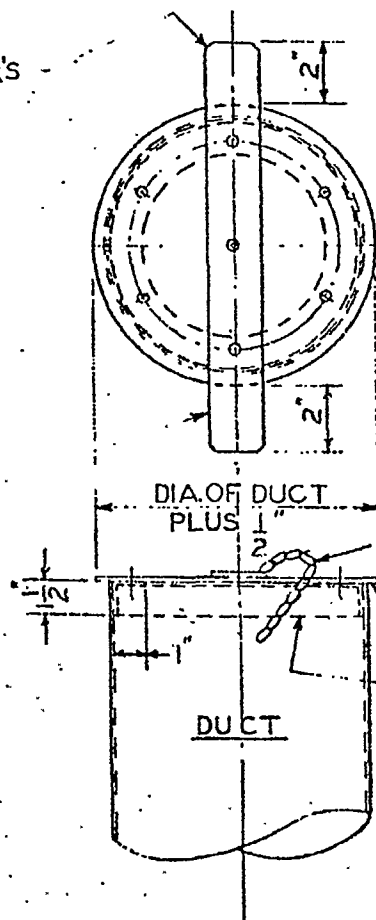
D-204.1

DATE: 3-23-44
APPROVED: [Signature]

U - STANDARD

ROUND DUCT - END

BREAK ALL CORNERS

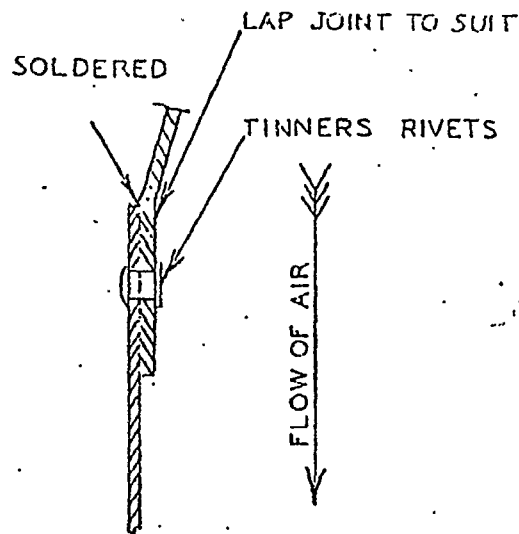


NO. 60 SASH CHAIN
HOT GALVANIZED.
BOLT TO DUCT & COVER.
LENGTH TO SUIT.

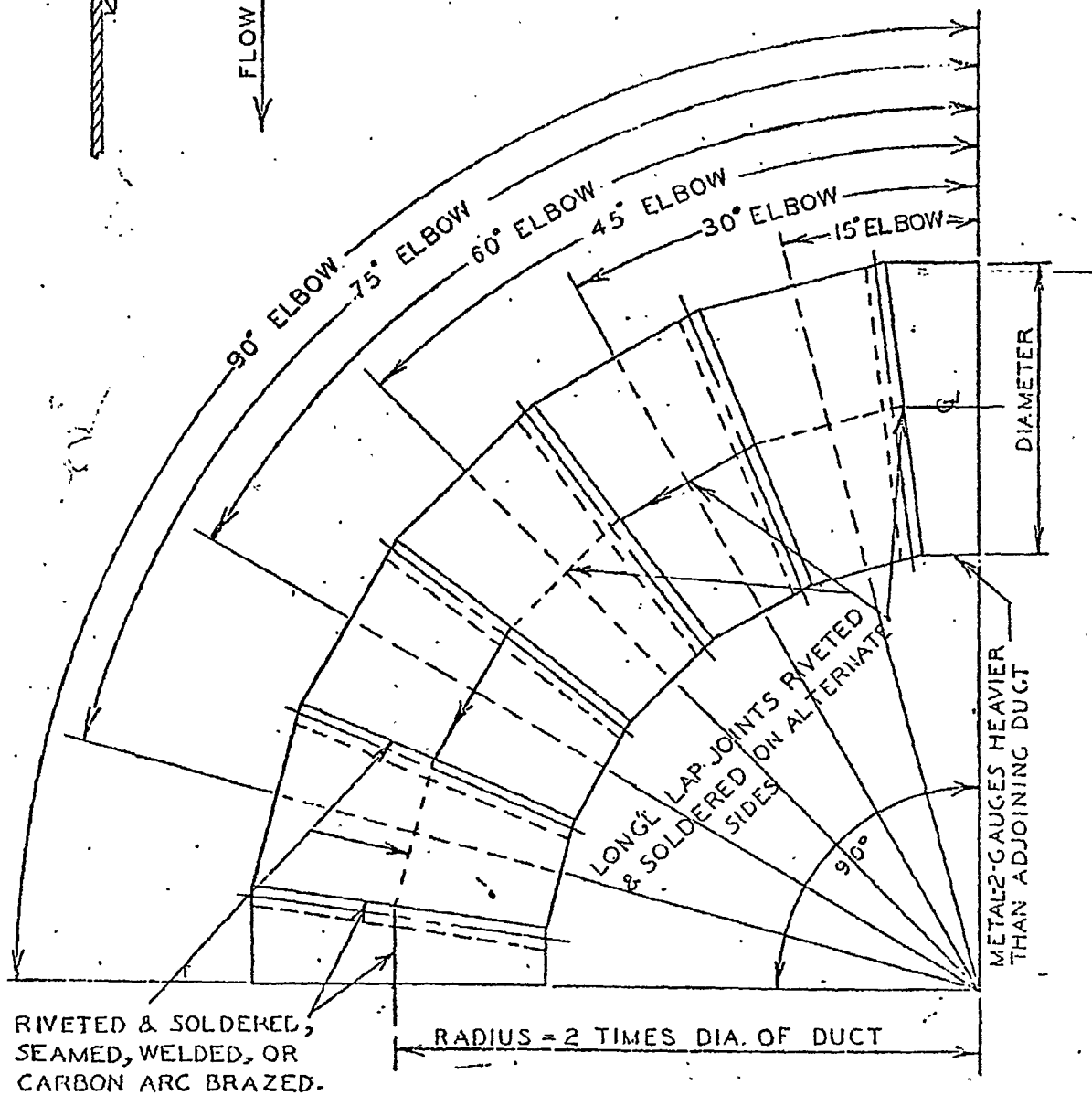
20 GA. GALV. SHEET STEEL
CURB RIVETED TO COVER WITH
4 LB. TINNERS RIVETS SPACED
APPROX. 6" O.C.
CURB TO FIT SNUGLY INTO DUCT.

DUCT SIZE	BAR SIZE	RIVET SIZE	RIVET SPACING
12" & UNDER	1" x 1 1/2"	10 LB. TINNERS	NOT MORE THAN 6"
13" & OVER	3" x 2"	16 LB. TINNERS	NOT MORE THAN 6"

DUCT SIZE	COVER U.S.S. GAGE
8" & UNDER	#22
9" TO 18"	#20
19" TO 30"	#18
31" & OVER	#16



7 PIECE 90° ELBOW



DUCT CONSTRUCTION

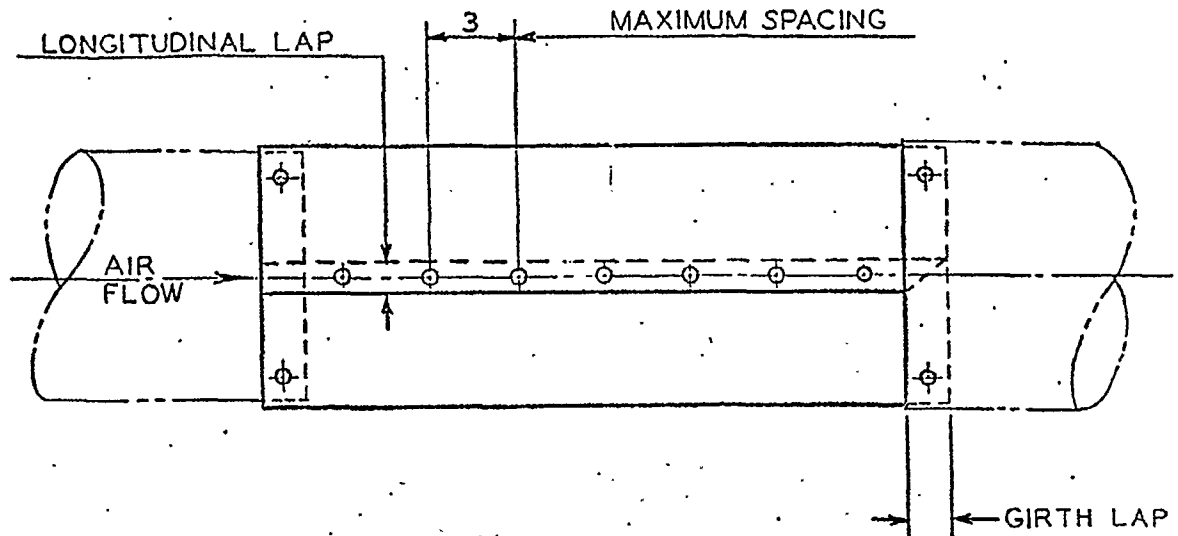
D-2011-2

DATE: / / PG. OF

U - STANDARD

ROUND DUCTS - ABRASIVE DUST

APPD. / /



DIAMETER OF DUCT	METAL THICKNESS U.S. STD. GAUGE	LONG'L. JOINTS		GIRTH JOINTS		
		LAP WIDTH	RIVET SIZE	LAP WIDTH	RIVET SIZE	NO. OF RIVETS
UP TO 8 INCL.	#20 (.0359)	1	3 LB	$\frac{3}{4}$	4 LB	4
OVER 8 TO 13 INCL.	#18 (.0478)	1	5 "	1	6 "	8
OVER 13 TO 18 INCL.	" "	1	5 "	1	6 "	12
OVER 18 TO 25 INCL.	#16 (.0598)	1	6 "	$1\frac{1}{4}$	8 "	16
OVER 25 TO 30 INCL.	" "	1	6 "	$1\frac{1}{2}$	8 "	20
OVER 30 TO 37 INCL.	#14 (.0747)	1	8 "	$1\frac{3}{4}$	10 "	24
OVER 37 TO 42 INCL.	" "	1	8 "	$1\frac{3}{4}$	10 "	28
OVER 42	" "	1	8 "	2	10 "	4 $\frac{1}{2}$ CTRS

NOTES:-

- CARBON ARC BRAZING OR WELDING MAY BE USED IN PLACE OF LAPPING & RIVETING.
- SPOT WELDING MAY BE USED IN PLACE OF RIVETS.



Westinghouse Electric Corporation

INDUSTRY & DEFENSE PRODUCTS

STURTEVANT DIVISION

HYDE PARK

BOSTON, MASSACHUSETTS 02136

STALLATION
BIRD AND SON
P. O. BOX 72
SHREVEPORT, LA. 71161

SALES OFFICE P. O. Box 4808, Atlanta, Ga. 30302

QUOTATION NO. N3849-AT PAGE -1- DATE 12/3/73

TERMS OF PAYMENT: 30 Days Net from Invoice Date

ATTN: MR. R. W. HAWKINS,
PLANT ENGINEER

DOMESTIC TERMS OF SHIPMENT:

RE: YOUR LETTER OF 11/9/73
DUST CONTROL SYSTEM
CENTRIFUGAL FAN

☐ New and complete apparatus on orders totaling \$1000 or more will have freight prepaid and allowed by Westinghouse via least expensive means to common carrier point nearest destination unless otherwise specified in this quotation.

☒ New and complete apparatus on orders totaling less than \$1000 plus all renewal parts will be shipped freight collect unless otherwise specified in this quotation.

propose to furnish the apparatus specified below at prices stated, and in accordance with the terms and conditions shown on the reverse side.

QUANTITY	DESCRIPTION	AMOUNT
1	⊗ STURTEVANT SIZE S413M INDUSTRIAL FAN WITH FLANGED INLET AND OUTLET IN ARRANGEMENT 10 WITH WEATHER COVER TO ENCLOSE BELTS, SHEAVES, MOTOR AND FAN SHAFT. PRICE INCLUDES ABOVE WITH 10HP TEFC, 1800 RPM, 3/60/230/460 ⊗ MOTOR AND SUITABLE V-BELT DRIVE. UNIT PRICE.....\$961.00 FREIGHT CHARGES ARE NOT INCLUDED. <u>PERFORMANCE:</u> 3,300 CFM @10"SP @70°F .075#/FT.³ DENSITY, 1955 RPM, 8.7 BHP <u>DELIVERY:</u> 30 DAYS AFTER ORDER OR FAN MAY BE IN STOCK AT ORDER ENTRY. <i>Bud Davies</i> <i>≈ 526.00</i> <i>5-2-74 Factory</i>	

Plus any tax or charge now existing or hereafter imposed by Federal, State or Municipal authority upon merchandise or service herein described, or the production, sale, distribution, or delivery thereof, or upon any feature of this transaction.

Accepted _____
(date)

Respectfully Submitted

Westinghouse Electric Corporation

STURTEVANT DIVISION

By

R. WILLIAM CONKLIN

(TELEPHONE 404-885-5490)

SEE REVERSE SIDE FOR PRICE POLICY, TERMS AND CONDITIONS AND WARRANTY

QUOTATION
Form 20235N

THE CONDITIONS STATED BELOW SHALL TAKE PRECEDENCE OVER ANY OTHER CONDITIONS, AND NO CONTRARY, ADDITIONAL OR DIFFERENT PROVISIONS OR CONDITIONS SHALL BE BINDING ON WESTINGHOUSE UNLESS ACCEPTED BY WESTINGHOUSE IN WRITING.

QUOTATIONS

Quotations made by the Sturtevant Division of the Westinghouse Electric Corporation are subject to acceptance within 30 days from date of quotation.

PRICES

Prices are subject to change without notice.

PRICE ADJUSTMENT

Prices on products manufactured by the Sturtevant Division of Westinghouse Electric Corporation included in quotations are those prevailing at time of quotation. These prices are firm, provided shipment of product is made within one year from date of purchase order. Shipments made after one year from date of purchase order are subject to adjustment to Corporation's prices in effect at the time of shipment.

Westinghouse warrants that the equipment when delivered will be of the kind and quality described herein and will be free of defects in workmanship and material. Such warranties shall be in effect until one year after the date of installation or two years after the date of delivery, whichever is earlier.

In the event of any failure to conform to these warranties, Westinghouse shall, upon written notification thereof and substantiation that the equipment has been stored, installed, operated and maintained in accordance with Westinghouse recommendations correct such non-conformities by repair, replacement or modification of the defective part or parts, F.O.B. factory or repair facility.

Abrasion, erosion, corrosion, heat, external forces or unusual operations may cause equipment to deteriorate and may affect the durability of special metals and coatings. Any resulting need for repair or replacement of Westinghouse

WARRANTY

RESALE OR FOREIGN PRODUCTS

Prices on products not manufactured by the Sturtevant Division, but included as resale items in quotations are subject to vendors' terms and price adjustments based on any increase or decrease in the cost of these products. Vendor's warranty applies.

Resale items include products manufactured or sold by other Divisions of Westinghouse (motors, starters, etc.), as well as products of other manufacturers such as variable speed magnetic and hydraulic couplings, flexible couplings, vibration eliminator bases, V-belt drives, Aerofin coils and specifically negotiated protective coatings.

CONTRACT DRAWINGS

Unless otherwise stated by Westinghouse in writing, prices include one set of any contract drawings specified by the purchaser in his request for quotation. If customer-initiated changes are required, a second set of contract drawings will be furnished without charge. Any additional new or revised contract drawings necessitated by purchaser-initiated changes will be provided only upon receipt of a written purchase order authorizing charges based on costs incurred by Westinghouse in furnishing such contract drawings.

equipment, even occurring during the warranty period, shall be the responsibility of the Purchaser. Since the Purchaser is familiar with the environment in which the equipment will operate, the Purchaser, rather than Westinghouse, shall specify the use of specialty metals and coatings. Westinghouse warrants only that fabrication of equipment using specialty metals and the application of coatings will be consistent with the supplier's standards.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PURPOSE. Correction of non-conformities, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of Westinghouse for failure to comply with the above warranties whether any claim is based in contract or in tort (including negligence).

STORAGE OF CUSTOMER'S EQUIPMENT

The Sturtevant Division, upon acceptance of a separate contract, will store a customer's equipment and will provide the necessary preparation for storage, movement to and from a storage area of the Division's choosing, and necessary protection of the equipment. The Sturtevant Division also will assume complete responsibility for the stored apparatus with full warranty

extension for any contractual period of storage.

The charge for these services will be 5% of the contract value of the equipment to be stored plus 1% of the contract value of the equipment in storage for each month of the storage period.

TERMS AND CONDITIONS

TAXES

The price does not include any Federal, state or local property, license, privilege, sales, use, excise, gross receipts or other like taxes which may now or hereafter be applicable to, measured by or imposed upon or with respect to the transaction, the property, its sale, its value or its use, or any services performed in connection therewith. Purchaser agrees to pay or reimburse any such taxes which Westinghouse or Westinghouse's subcontractors or suppliers are required to pay.

MINIMUM BILLING

The minimum billing charge shall be \$50.00 plus transportation charges.

TERMINATION

Any order or contract may be terminated by the purchaser only upon payment of reasonable charges based upon expenses already incurred and commitments made by Westinghouse. Expenses include Engineering, Administrative and Marketing, as well as Manufacturing expenses.

PAYMENTS

If, in the judgment of Westinghouse, the financial condition of the Purchaser, at any time during the manufacturing period or at the time apparatus is ready for shipment, does not justify the terms of payment specified, Westinghouse may require full or partial payment in advance.

Pro rata payments shall become due as shipments are made. If shipments are delayed by the purchaser, payments shall become due from date when Westinghouse is prepared to make shipment. If manufacture is delayed by the purchaser, payment shall be made based on the contract price and percent of completion. Apparatus held for the purchaser shall be at the risk and expense of the purchaser.

PATENTS

Westinghouse shall, at its own expense, defend any suits or proceedings brought against the purchaser so far as based on a claim that any apparatus or any part thereof furnished hereunder constitutes an infringement of any patent of the United States, other than a claim covering a process or a product thereof, except when performance of such process is inherent in the operation of such apparatus, provided that such apparatus is sold or offered for sale by the Corporation as a standard commercial item, or is made for purchaser in accordance with the Corporation's design, and is used in the form, state or condition as sold by the Corporation, if purchaser shall have made all payments then due hereunder, and if the Corporation is notified promptly in writing, and given authority, information and assistance for the defense of said suit or proceeding, and the Corporation shall pay all damages and costs awarded therein against the purchaser, provided that this agreement shall not extend to any infringement based upon use of said apparatus or any part thereof in a manner not contemplated between purchaser and the Corporation at the time of this transaction, nor upon the use of or sale of any said apparatus or any part or parts thereof in combination

LIMITATION OF LIABILITY

Westinghouse shall not be liable in contract or in tort for special, indirect, incidental, or consequential damages, such as, but not limited to, loss of profits or revenue, loss of use of equipment, cost of capital, or claims of customers of Purchaser. The remedies of the Purchaser set forth herein are exclusive, and the liability of Westinghouse with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, installation or technical direction of installation, repair or use of any equipment covered by or furnished under this contract whether in contract, in tort, or otherwise, shall not exceed the price of the equipment or part on which such liability is based.

with apparatus or things not furnished hereunder. The Corporation shall not be responsible for any settlement of such or proceeding made without its written consent. In case the apparatus or any part thereof furnished hereunder is in such suit held to constitute infringement and its use is enjoined, the Corporation shall, at its option and its own expense, either procure for the purchaser the right to continue using said apparatus or part thereof; or replace it with non-infringing apparatus; or modify it so it becomes non-infringing; or remove it and refund the purchase price and the transportation and installation costs thereof. The foregoing states the entire liability of the Corporation with respect to patent infringement by said apparatus or any part thereof.

To the extent that said apparatus, or any part thereof, is supplied according to purchaser's design or instruction, or is modified by purchaser, or combined by purchaser with apparatus or thing not furnished hereunder, or is used by purchaser to perform a process, purchaser agrees to indemnify the Corporation in the manner, and to the extent set forth in the preceding paragraph insofar as the terms thereof are appropriate.

TERMS OF SHIPMENT — DOMESTIC AND EXPORT

DOMESTIC (excluding shipments to Hawaii, Alaska and U.S. Possessions)
All shipments are F.O.B. cars, point of shipment.

a) New and complete apparatus on orders totaling \$1000 or more will have freight prepaid and allowed by Westinghouse via least expensive means to common carrier point nearest destination unless otherwise specified in this quotation. Additional or more expensive transportation costs, for any reason, will be added to invoice and paid by purchaser.

Shipments to Hawaii, Alaska and U.S. Possessions will be prepaid by Westinghouse to the common carrier point in the continental United States nearest the point of departure from the continental United States. No allowance will be made in lieu of transportation if purchaser accepts delivery at point of shipment. Transportation costs will not be deducted from a selling price.

b) New and complete apparatus on orders totaling less than \$1000 plus all renewal parts will be shipped freight collect unless otherwise specified in this quotation.

c) Resale items including products manufactured or sold by other Divisions of Westinghouse (motors, starters, etc.), as well as products of other manufacturers such as couplings, vibration eliminators, bases, V-belt drives and Aerofin coils will carry the same terms of shipment which are extended to Sturtevant Division of Westinghouse by these suppliers.

EXPORT — All shipments are F.O.B. cars, point of shipment.

a) Additional charges are made for export packing.

b) Complete apparatus and Renewal Parts are shipped prepaid by Westinghouse to any East Coast United States port, alongside ship. Additional charges will be made to shipments to Gulf Coast or Pacific ports.

INDUSTRIAL CLEAN AIR, INC.
2929 Fifth Street
Berkeley, CA 94710

TRANSMITTAL

To BIRD & SON
P.O. Box 72
SHREVEPORT LA. 71161

Attn: R.W. HAWKINS

Via AIR MAIL

Date 8-7-74

Your P.O. No. 13-3170

Our Order No. N-5380

Project #2-800 DUST COLLECTOR

Gentlemen:

☒ Enclosed herewith.

☐ Under separate cover.

☐ Approval required prior to start
of fabrication. Please return
_____ signed approved prints.

☒ For your files. Approval not
required prior to fabrication.

Quantity	Description	Prints	Sepias
2	GEN. ARR. #2800 D.C.	DC-3189	
2	ASS'Y DETAILS #2-800 D.C.	DC-3246	
2	ASS'Y OPER & MAIN. INST	X	
2	SPARE PARTS LIST	X	

cc: ENVIRONMENTAL CONTROLS INDUSTRIAL CLEAN AIR, INC.

ATTN: OTIS LUKER

A. d. Lusk



INDUSTRIAL CLEAN AIR

February 18, 1976

BIRD & SON
P. O. Box 72
Shreveport, LA 71161

Attention: Mr. R. W. Hawkins
Reference: Your P. O. #13-3170
ICA #2-800 SW Dust Collector

Dear Mr. Hawkins,

Please find enclosed copies of the wiring diagram for the Relay Timer and associated equipment as you requested. We trust this will answer any questions you may have.

Regarding spare Polybrade filter bags, our current net price is \$4.80 each. FOB Tempe, Arizona.

Please do not hesitate to contact us or our area representative noted below if we can be of any additional service.

Very truly yours,
INDUSTRIAL CLEAN AIR, INC.

Bob Andrew

Robert V. Andrew

RVA/bg

encl.: Relay Timer Schematic (3)

CC: Mr. Harold Knape
H. O. Knape & Co.
P. O. Box 66669
Houston, Texas 77006

*2-13-81
EPA Investigator then
installation. Geo Wacker
ordered a spare set of bags. JPB
now in L.A. 213-633-1710*

INDUSTRIAL CLEAN AIR, INC.
2929 Fifth Street
Berkeley, CA 94710

TRANSMITTAL

To BIRD & SON
P.O. Box 72
SHREVEPORT LA. 71164
Attn: R. W. HAWKINS

Via AIR MAIL
Date 7-12-74
Your P.O. No. 13-3170
Our Order No. N5380
Project # 2-800 DUST COLLECTOR

Gentlemen:

- ☒ Enclosed herewith. ☐ Under separate cover.
☐ Approval required prior to start of fabrication. Please return signed approved prints. ☒ For your files. Approval not required prior to fabrication.

Quantity	Description	Prints	Sepias
4	GEN. ARR. #2-800 D.C.	CERTIFIED	
	DWG # DC-3189 REV.2		

cc: _____

INDUSTRIAL CLEAN AIR, INC.

A. J. Llewellyn

WHEN START B UTTON IS PRESSED
FAN STARTS & RELAY CONTACTS
OPEN UP AND TIMERS RESET.

WHEN STOP B UTTON IS PRESSED FAN
STOPS AND THE RELAY CLOSSES. THIS
STARTS DELAY TIMER.

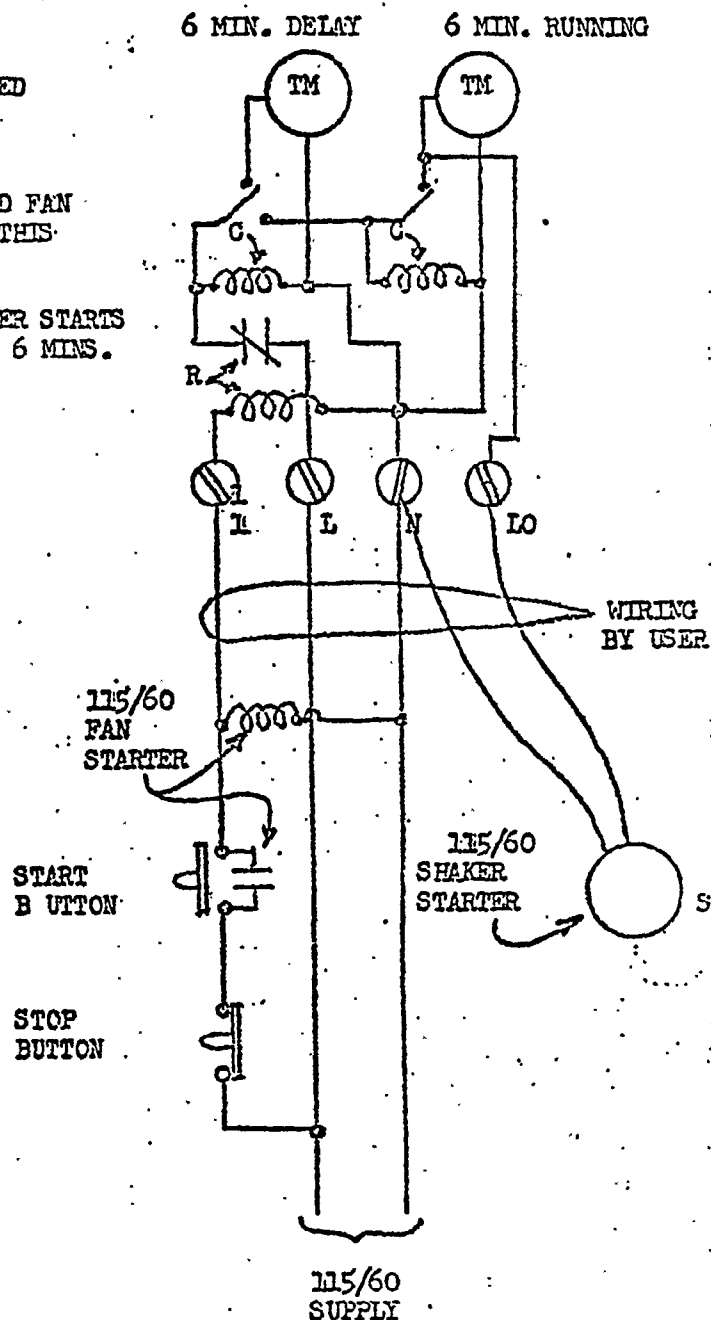
AT END OF DELAY RUNNING TIMER STARTS
SHAKER & TURNS IT OFF AFTER 6 MINS.
OR ANY PORTION THEREOF.

KEY:

C - TIMER CLUTCH

TM - TIMER MOTOR

R - RELAY, NORMALLY CLOSED





Environmental Controls, Inc.

Post Office Box 24378

New Orleans, Louisiana 70124

May 14, 1974

(504) 282-2975



AMERICAN SOCIETY
OF
HEATING, REFRIGERATING and
AIR-CONDITIONING ENGINEERS



The American Society
of
Mechanical Engineers

Mr. R. W. Hawkins,
Plant Engineer
Bird & Son
P. O. Box 72
Shreveport, La. 71161

Dear Mr. Hawkins:

Thank you very much for your purchase order No.13-3170 for ICA proposal #R 311-16. I was able to phone in the order in time to beat the deadline for the May 15th price increase.

I am unable to give you the exact amount of the increase, but it will be in the neighborhood of 5% as we discussed. Written confirmation will be on the way to both of us in a day or two.

I sincerely appreciate your placing this order with us. You may be sure that you have made the wisest choice of equipment, and I'll do my best to represent them as well.

Thanks again.

Sincerely,

O. W. Luker, Jr.
President and Senior Engineer



AIR POLLUTION CONTROL

INDUSTRIAL CLEAN AIR

2929 FIFTH STREET • BERKELEY, CALIFORNIA 947
TELEPHONE: 841-1111 • TELETYPE: 841-1111

June 24, 1975

BIRD & SONS, INC.
P.O. Box 72
Shreveport, Louisiana 71161

Attention: Mr. R. W. Hawkins
Plant Engineer

Re: ICA #2-800 SW Dust Collector
Bird & Son P.O. 13-3170
ICA N-5380

Dear Mr. Hawkins,

An intermittent duty dust collector should be cleaned at regular intervals; typically every four or eight hours. After cleaning, the cloth pressure drop will be in the range of 0.5" to 1.5" WG and thereafter will rise as particulate is deposited on the bags. We generally recommend shaking at between 4.0" to 6.0" WG, although small variation from this will have minimal effect.

Very frequent shaking will reduce bag life, so we would recommend against this. Also, shaking duration should be kept to a minimum, on the order of 15-30 seconds.

Trust this answers your questions. If not please don't hesitate to contact us.

Very truly yours,

INDUSTRIAL CLEAN AIR, INC.

P. MICHAEL WATSON
PMW/pm

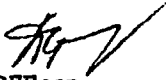
PS - A timer schematic will follow under separate cover.

3906

MEMORANDUM

In Reply to _____ Date 1/29/74 From D. E. Frazier To A. G. Marsh - FS ✓
cc: J. K. Colvin
Subject ASBESTOS CONTROL SYSTEM - SHREVEPORT CEMENT PLANT R. E. Heim

Please advise us on your progress with this project. When will you have a work order ready outlining the cost, etc?


DEF:en

BIRD 016958

IBM 4371 DRAKE

MEMORANDUM
SHREVEPORT

In Reply to memo 1-29-74 Date 2-6-74 From A. G. Marsh To Mr. D. E. Frazier - BBR
Subject ASBESTOS CONTROL SYSTEM cc: Mr. J. K. Colvin - ME
Mr. R. E. Bain - BB

We are unable to obtain a quotation from Johns-Manville for them to install the subject system. Their original estimate was \$32,000.

Local quotations indicate the system can be installed for \$26,000. This does not include \$12,000 required to install automatic sprinkler system to conform to Factory Mutual requirements.

We are ready to initiate the work order.

1-0650-13-01-19-454

AGM/ev

CAF J-1202

5-A

BIRD 016964